FREE DVD AND VCD BURNING SOFTWARE!

2 CDs PLUS CD-R

AUSTRALIAN PC USER

AUGUST 2003 $7.95 inc. GST NZ$8.50 inc. GST

PLAY IT AGAIN

Your complete guide to finding music online, making your own and burning audio CDs

Plus: 35 pages of tips including how to revive your old photos and LPs

50 PAGES OF REVIEWS:

- CD burners from $79
- Top 5 PCs for $1,500
- 5MP camera for $1,000
- $2,000 data projector
- Budget laser printers
- GeForce FX 5900
- Best ever real-time strategy game
- Best music, audio and CD burning software

IF YOUR COVER CD IS MISSING, PLEASE ENQUIRE AT PLACE OF PURCHASE

ACP 08 9 313006 001416

you with lots of 'computer tech-talk'. Just straightforward, helpful advice. We will help you custom-build your computer to suit your needs. And because we cut out the middleman you'll receive great savings. Or if you know what you want visit www.dell.com.au and configure it online. You get the latest technology delivered straight to your door and **until 25th July 2003 delivery is free on all featured Dimension™ and Inspiron™ systems.**

Inspiron 8500
E•VALUE CODE J540712

ıe or a notebook for work on the go. (To see our whole range visit www.dell.com.au)

Inspiron 1100 — From 3.3kg, 45mm thin

Budget friendly with FREE delivery
Offer valid until 25th July 2003

- **Intel® Pentium® 4 Processor 2.4GHz**
- 256MB shared DDR SDRAM (up to 64MB of system memory may be allocated to support system graphics)
- 20GB[1] hard drive
- **24X Max CD-RW**
- **14.1" XGA TFT display (1024x768 res)**
- Internal 56K capable modem
- WordPerfect® Productivity Pack
- Microsoft® Windows® XP Home Edition

$2,199* Offer valid until 25th July 2003 E•VALUE CODE J540702 - PCU

Prices include GST. By delivery only.

Inspiron 8500 — From 3.1kg, 39mm thin

Widescreen, great price, FREE delivery
Offer valid until 25th July 2003

- **Mobile Intel® Pentium® 4 Processor 2.2GHz - M supporting Enhanced Intel® SpeedStep® technology**
- 256MB DDR SDRAM
- 30GB[1] hard drive
- 64MB DDR nVidia® GeForce™4 4200 Go AGP 4X graphics
- 24X Max CD-RW/DVD[4] combo drive
- **15.4" Wide-Aspect UltraSharp™ XGA LCD (1280x800 res)**
- WordPerfect® Productivity Pack
- Microsoft® Windows® XP Home Edition

$2,999* Offer valid until 25th July 2003 E•VALUE CODE J540710 - PCU

Prices include GST. By delivery only.

Inspiron 8500 — From 3.1kg, 39mm thin

Burn CDs & DVDs plus FREE delivery
Offer valid until 25th July 2003

- **Mobile Intel® Pentium® 4 Processor 2.5GHz - M supporting Enhanced Intel® SpeedStep® technology**
- **512MB DDR SDRAM** • 60GB[1] Hard Drive
- 64MB DDR nVidia® GeForce™4 4200 Go AGP 4X graphics
- **DVD[4]+RW[5] combo drive (burn CDs and DVDs)**
- **15.4" Wide-Aspect UltraSharp™ WSXGA+ LCD display (1680x1050 res)**
- Internal 56K capable fax modem
- WordPerfect® Productivity Pack
- Microsoft® Windows® XP Home Edition

$3,999* Offer valid until 25th July 2003 E•VALUE CODE J540712 - PCU

Prices include GST. By delivery only.

s or for other upgrades check our website or call.

Upgrade to 24X Max CDRW/DVD[4] combo drive for $100*
Upgrade to 40GB[1] hard drive for $149*

Upgrade to 60GB[1] hard drive for $199*
Add a leather carry case for $139*

Add a leather carry case for $139*
Get a second battery for $174*

ls, here are a few

Purchase Microsoft® Office XP with your new Dell™

Did you know that you can get Microsoft® Office XP pre-installed with your Dell computer? It is convenient, affordable and it will come factory installed on your system. You'll save time and have a fully licensed version of Microsoft® Office XP ready to run your applications.

Upgrade from WordPerfect® Productivity Pack to Microsoft® Works Suite 2003 (brings together the full versions of Microsoft® Word, Works, Money Standard, Encarta Standard, Pictureit!, Photo and Streets + Trips, all in one easy package) — For $99* Including GST.

Upgrade from WordPerfect® Productivity Pack to Microsoft® Office XP Small Business (includes Word, Excel, Outlook and Publisher) — For $369* Including GST.

Upgrade from WordPerfect® Productivity Pack to Microsoft® Office XP Professional with Publisher (includes Word, Excel, Outlook, Publisher, PowerPoint, and Access) — For $578* Including GST.

Third party products excluded from Dell's warranty. Manufacturer's warranty applies.

All featured systems come standard with: 1 year limited next business day on-site[2] service (excludes software and Axim), WordPerfect® Productivity Pack and 3 months' free[3] AOL membership for new members (Conditions apply[3]. Modem required for AOL access.) Desktops come with Norton Anti-Virus 2003 – OEM Version.

Dell recommends Microsoft® Windows® XP Professional for Mobile Computing

Easy as DELL™

Available by delivery only. Standard delivery fee of up to $99 (inc.GST) applies to all systems purchased unless otherwise stated. A standard delivery fee for Axim r inadvertent errors may occur for which Dell may not be responsible. Prices/offers cannot be combined with any other discount/promotion. Dell, the Dell logo, Dimension, Inspiron, are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Intel, the Intel Inside logo, Pentium, Celeron and Intel SpeedStep n this document to refer to either the entities claiming marks and names or their products. Dell disclaims proprietary interest in the marks and names of others. **1. For hard drives,** note locations. Contact Dell for details. Technicians shall be dispatched if necessary following telephone technical support. Excludes third party products and software. **3. The AOL** rges. You must be 18 years or older. Access to AOL requires a credit card & is subject to credit approval. Only one membership per household permitted on this Offer. The three free E Plan (VALUE Plan price currently $27.95 per month for up to 90 hours access to the AOL Service and $0.90 for every additional hour in the same billing month plus telecommunications OL by calling 1800 265 265 (between 8am and 8pm AEST, weekdays) prior to the end of the free trial. Modem required for AOL access. **4. The DVD region code** can be changed up for software applications. **5. Disks burned** with this drive may not be compatible with some existing drives and players; using DVD+R media provides compatibility.

W 2086. (No showroom on-site.)

DELD5619/PCU/GSPREAD/07/14/R

intel inside pentium 4

It's as easy as Dell™.

If you're looking to buy a new desktop or notebook you want the best value you can find. But the thought of how and where to start, can be a little daunting. Don't worry, there's a simple solution. Pick up the phone and call Dell. You'll speak to a helpful assistant who will work out with you exactly what you need – and nothing that you don't. And we won't try and confuse

Dimension™ 8300
E•VALUE CODE J240717

STEP 1 Choose the computer that best suits your needs - whether it's a desktop for hom

Dimension 2400

Budget friendly with FREE delivery
Offer valid until 25th July 2003

- Intel® Celeron™ Processor 2.3GHz
- 256MB shared DDR SDRAM (Up to 32MB system memory may be allocated to support system graphics)
- 40GB[1] hard drive • **48X Max CD-RW**
- **17" CRT monitor (16.0"v.i.s.)**
- Stereo speakers
- 56K modem
- Integrated networking
- WordPerfect® Productivity Pack
- Microsoft® Windows® XP Home Edition

$1,199* Offer valid until 25th July 2003 E•VALUE CODE J210704 - PCU

Prices include GST. By delivery only.

Dimension 2400

Great multimedia value, FREE delivery
Offer valid until 25th July 2003

- **Intel® Pentium® 4 Processor 2.4GHz**
- 256MB shared DDR SDRAM (Up to 32MB system memory may be allocated to support system graphics)
- 40GB[1] hard drive • **48X Max CD-RW**
- **17" CRT monitor (16.0"v.i.s.)**
- Stereo speakers
- 56K modem
- Integrated networking
- WordPerfect® Productivity Pack
- Microsoft® Windows® XP Home Edition

$1,499* Offer valid until 25th July 2003 E•VALUE CODE J210705 - PCU

Prices include GST. By delivery only.

Dimension 8300

Cutting edge technology plus FREE delivery
Offer valid until 25th July 2003

- **Intel® Pentium® 4 Processor with HT Technology 2.8GHz**
- Intel® 875P Chipset • **256MB DDR SDRAM at 400MHz**
- 80GB[1] hard drive • 64MB nVidia® GeForce™4 MX 420 graphics card • SoundBlaster® Live!™ 5.1 sound card
- **DVD[4]+RW[5] combo drive (burn CDs and DVDs)**
- 17" CRT monitor (16.0"v.i.s.)
- Speakers with subwoofer • 56K modem
- Integrated networking
- WordPerfect® Productivity Pack
- Microsoft® Windows® XP Home Edition

$2,499* Offer valid until 25th July 2003 E•VALUE CODE J240717 - PCU

Prices include GST. By delivery only.

STEP 2 Personalise your computer to suit your needs. Choose from these upgrade option

Upgrade to 48X Max CD-RW/DVD[4] combo drive for $99*
Upgrade to 60GB[1] hard drive for $60*

Upgrade to 15" Flat Panel Monitor for $352*
Upgrade to 80GB[1] hard drive for $110*

Upgrade to 120GB[1] hard drive for $149*
Upgrade to 3 year limited next business day on-site[2] service (excludes software) for $169*

STEP 3 Now gearing up your computer is easy. Choose from our great range of peripher

Lexmark Z605

Easy printing with great results

- Print up to 14ppm black and up to 8ppm colour
- Print 35mm photo quality resolution

Including GST and delivery **$99***

Dell Axim™ X5

The Axim X5 allows you to connect and synchronise your files from your notebook or desktop keeping you organised and productive on the go.

- Intel® X-Scale™ Processor at 300MHz • Microsoft® Pocket PC 2003 Premium
- Brilliant 3.5" Colour Transflective LCD (240x320 res)

Including GST and delivery **$463***

Third party products excluded from Dell's warranty. Manufacturer's warranty applies.

STEP 4 Order online or on the phone and we'll deliver direct to your door.

Click and save when you buy online
www.dell.com.au

Or call Dell direct on
1300 303 192

***DELL'S NORMAL TERMS AND CONDITIONS APPLY AND ARE AVAILABLE AT www.dell.com.au OR ON REQUEST. All prices shown are inclusive of GST X5 is $64 (inc. GST) per system applies to all orders unless otherwise stated.** All efforts will be made to check for errors in typography and photography; howeve PowerEdge, PowerVault, Axim and Evalue are registered trademarks or trademarks of the Dell Computer Corporation. Microsoft , Microsoft Pocket PC 2003 and Windows are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Other trademarks and trade names may be used GB means 1 billion bytes. Accessible capacity varies depending on operating environment. **2. On-site service** and/or next business day service not available in some re **Trial Offer** is valid until 25th July 2003. Offer is not available to persons who are AOL Members as at 14 December 2002. Offer does not include telecommunications cha months are consecutive months only from the date of registration (maximum 92 days). At the end of the three free months you will automatically be migrated to AOL's VALU charges) at which point your monthly membership fee will commence being charged to your credit card. If you do not wish to continue your membership, you must notify A to 5 times and will then be locked on the final region code selected. The region setting applies to commercial DVD movies only and in no way affects use of DVD media

Copyright 2003 Dell Computer Corporation. All rights reserved. Dell Computer Pty Ltd (ACN 003 855 561) Building 3, 14 Aquatic Drive, Frenchs Forest NS

CLICK & SAVE

FOR OUR LATEST PRICING AND PROMOTIONS

GET FREE

on all featured Inspiron™

From 3.3kg, 47mm thin

Burn CDs and DVDs & FREE delivery

Offer valid until 25th July 2003

The Inspiron 5100 powered by the Intel® Pentium® 4 Processor 2.8GHz is the perfect balance of performance and price. With its moonlight-silver and venice-blue design, this stylish, streamlined notebook can be carried anywhere your busy life leads you. Plus if you order before 25th July 2003, we'll deliver it for FREE.

Consumer and Business Finance available

Ask about our financing options.

Inspiron 5100

- **Intel® Pentium® 4 Processor 2.8GHz** • 256MB DDR SDRAM
- 30GB[1] hard drive • 32MB DDR ATI Mobility Radeon™ 7500 AGP 4X graphics
- **DVD[4]+RW[5] combo drive (Burn CDs and DVDs)**
- **15" XGA TFT display (1024x768 res)** • Internal 56K capable modem
- WordPerfect® Productivity Pack • Microsoft® Windows® XP Home Edition

$2,999*

Prices include GST. By delivery only.
Offer valid until 25th July 2003. E•VALUE CODE J540705 - PCU

UPGRADE YOUR DELL™

- Get a second battery for $174*
- Upgrade to 40GB[1] hard drive for $99*
- Upgrade to Microsoft ® Office XP Small Business for $369*

Dell™ recommends Microsoft® Windows® XP Professional for Mobile Computing

intel inside pentium 4

Easy as DELL™

Visit **www.dell.com.au** or call **1300 303 192**

Mon to Fri 8am-9pm, Sat 9am-3pm, Sun 10am-4pm (EST)

DELD5619/PCU/FRONT/07/14/R

DELIVERY
and Dimension™ systems

CLICK & SAVE
WHEN YOU BUY ONLINE
@ www.dell.com.au

Smart value with FREE delivery
Offer valid until 25th July 2003

The Dimension 4600 features an Intel® Pentium® 4 Processor 2.4GHz, 512MB SDRAM, 48X Max CD-RW, 16X Max DVD-ROM[4] and a 15" Flat Panel Monitor. Plus if you order before 25th July 2003, we'll deliver it for FREE. Now that's outstanding value at only $1,999*.

Dimension 4600

- **Intel® Pentium® 4 Processor 2.4GHz** • 512MB DDR SDRAM
- 80GB[1] hard drive • 64MB nVidia® GeForce™4 MX 420 graphics card
- SoundBlaster® Live!™ 5.1 sound card
- 48X Max CD-RW • 16X Max DVD-ROM[4]
- **15" Flat Panel Monitor** • 56K modem • Stereo speakers
- WordPerfect® Productivity Pack • Microsoft® Windows® XP Home Edition

$1,999*

Prices include GST. By delivery only.
Offer valid until 25th July 2003. E•VALUE CODE J240709 - PCU

UPGRADE YOUR DELL™

- Upgrade to 128MB[1] ATI Radeon™ 9800 TX graphics card for $199*
- Upgrade to Microsoft® Office XP Small Business for $369*

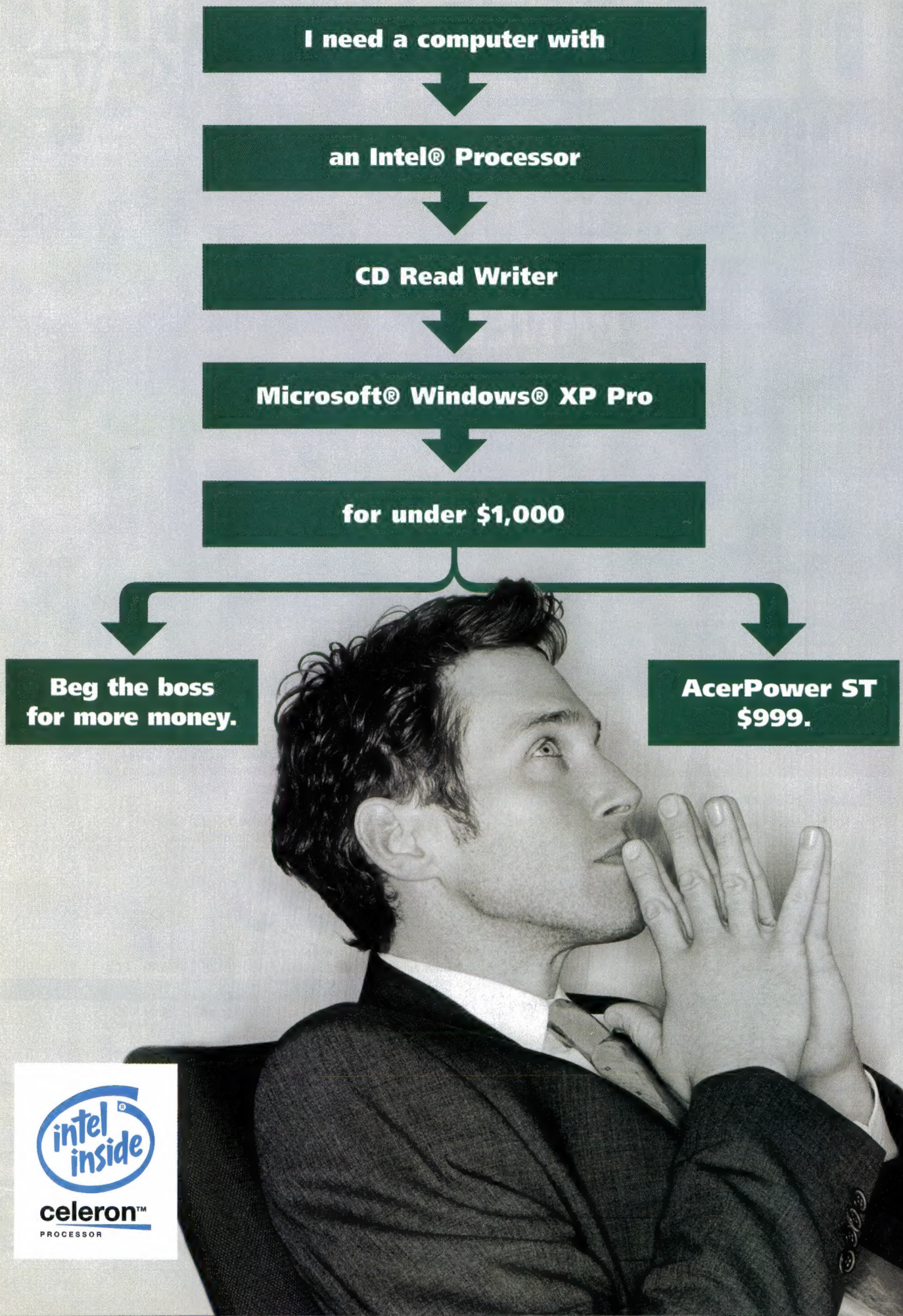
Dell™ recommends Microsoft® Windows® XP Professional

intel inside pentium 4

Easy as DELL™

Visit **www.dell.com.au** or call **1300 303 275**
Mon to Fri 8am-9pm, Sat 9am-3pm, Sun 10am-4pm (EST)

DELD5619/PCU/RH/07/14/R


I need a computer with
an Intel® Processor
CD Read Writer
Microsoft® Windows® XP Pro
for under $1,000
Beg the boss for more money.
AcerPower ST $999.
intel inside
celeron™
PROCESSOR

Give your company an injection of fresh technology with the AcerPower ST, for only $999. With its Intel® Celeron® Processor 2.4GHz and CD-RW, you'll be able to run a wide range of business functions from spreadsheets and word processing to power point presentations, as well as create your own CDs. And with Microsoft® Windows® XP Professional, you've got a total business solution at a totally affordable price.

GREAT LOW PRICE

AcerPower ST

• Intel® Celeron® Processor 2.4GHz • 256MB DDR SDRAM • 40GB hard disk drive • 52 x 24 x 52 x CD-RW • Integrated AC '97 audio • Integrated 10/100M LAN – Broadband Internet ready • Ultra AGP II video technology (AGP 8x equivalent for 3D/2D video applications) • Microsoft® Windows® XP Professional • 3 year limited (1 year on-site) warranty.

$999

RRP inc GST from $8.34 per week* Please quote e-Code STB010

GREAT VALUE

AcerPower ST

• Intel® Celeron® Processor 2.4GHz • 512MB DDR SDRAM • 40GB hard disk drive • 52 x 24 x 52 x CD-RW • Integrated AC '97 audio • Integrated 10/100M LAN – Broadband Internet ready • Ultra AGP II video technology (AGP 8x equivalent for 3D/2D video applications) • Microsoft® Windows® XP Professional • Acer 17" monitor • 3 year limited (1 year on-site) warranty.

$1,299

RRP inc GST from $10.85 per week* Please quote e-Code STB011

GREAT VALUE & PERFORMANCE

- **Fast 3.06GHz Processor**

AcerPower ST

• Intel® Pentium® 4 Processor with HT Technology 3.06GHz • 256MB DDR SDRAM • 40GB hard disk drive • 52 x 24 x 52 x CD-RW • Integrated AC '97 audio • Integrated 10/100M LAN - Broadband Internet ready • Ultra AGP II video technology (AGP 8x equivalent for 3D/2D video applications)• Microsoft® Windows® XP Professional • Acer 17" monitor • 3 year limited (1 year on-site) warranty.

$1,999

RRP inc GST from $16.69 per week* Please quote e-Code STB007

TOP PERFORMANCE

- **Fast 2.8GHz Processor with Hyper Threading Technology and DDR400 memory**

Veriton 7600G

• Intel® Pentium® 4 Processor with HT Technology 2.8GHz • 512MB DDR400 SDRAM • 80GB 7200rpm hard disk drive • 48 x 24 x 48 x CD-RW + 16 x DVD combo drive • Integrated AC '97 audio • Desktop speakers • Integrated 10/100/1000 LAN - Broadband Internet ready • 128MB GeForce FX5200 AGP 8x graphics card • Microsoft® Windows® XP Professional • Acer 17" monitor • 3 year limited (1 year on-site) warranty.

$2,499

RRP inc GST from $20.87 per week* Please quote e-Code V7602

Acer recommends Microsoft® Windows® XP Professional for Business.

shopAcer

www.acer.com.au

1300 366 567

Authorised Dealers

Intel, the Intel Inside Logo, Pentium and Celeron are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. ©2003 Acer, Inc. All rights reserved. Acer and the Acer logo are registered trademarks and Acerpower ST and Veriton are trademarks of Acer Inc. Product specifications and recommended retail prices are subject to change without prior notice. All other products, brand names, company names and logos are trademarks of their respective companies. Pictures are for illustrative purposes only.

†Valid until 11 August 2003 or while stocks last. *Rental amounts shown are indicative and based upon a 36-month rental contract and rates at time of publication; all state and federal government charges (Stamp Duty & GST) included. Rental figures quoted are for business use only and require a minimum purchase of $2000 ex GST. All rentals are subject to credit approval. Provided by Acer Finance Australia Pty Ltd. Individual dealers may offer alternative financing options.

W5 Group ACE222/PCU

acer

Empowering People

3 of our best machines

CFP3253/PCU

Print

Scan

Copy

All in one

Borderless photo prints

Only $299 rrp

canon.com.au

1800 021 167

imageCLASS MPC190

Canon

advanced simplicity™

Design: David Collins

Your complete guide to finding music online, making your own and burning audio CDs.

CD burners for all needs 34
CD burning and audio tools 46
Music software 56
Complete guide to digital audio 64
Pianos for your PC 112

35 PAGES OF TIPS

Copy LPs to CD 64
Revive old photos ... 90

plus many more tips and tricks for Windows and Linux PCs.

BUDGET LASERS

Workgroup and colour lasers for under $2,000 on page 104.

contents

LOG IN

CD contents 8
Editorial 10
Warp speed 12
Readers' letters 14
Reader report 16
Privacy notice/terms and conditions 16

TEST BENCH

Hardware reviews 18
Epson EMP-S1, ASUS WLAN WL-300g and WL-100g, Hewlett-Packard PhotoSmart 935, Canon PowerShot Digital IXUS II, A4Tech Petite Cordless Mouse.

Software reviews 20
AOL|7 Broadband, OnlineHomeBase.com, RH32 Mobile Rack, Adobe Acrobat 6, PowerPlugs Ultimate Combo 10 Plus.

Top five PCs 24
We check out the latest systems under $1,500.

Upgrade report 28
Tested: processors, motherboards, graphics cards.

Top buys 32
Our favourite hardware and software products.

FEATURES

CD burners for all needs 34
With prices as low as $79, everyone should have a CD burner.

CD burning and audio tools 46
Create your own audio CDs with these burners and other tools.

Make and mix your own music 56
Produce your own music. We show you the tools to use.

HELP STATION

From Vinyl to CD 64
A guide to digitising and mastering your music.

Cover CD Tutorial 71
Use PowerProducer 1.0 to make your own DVDs.

Music Hardware 72
Make music using MIDI and your PC.

Cover CD Tutorial 74
A guide to using ChordWizard 1.5.

Internet music 75
Where to find the best music resources online.

1 AUSTRALIA'S TOP-SELLING TECHNOLOGY MAGAZINE

CIRCULATION: 63,332 copies sold per issue (ABC Circulation Audit, December 2002).
READERSHIP: 391,000 readers per issue (Morgan Readership Survey, March 2003).
WINNER of this year's Sun Microsystems IT Journo Awards 'Best Technology Title'

FIRST REVIEWS

50 pages of reviews:

CD Burners from $79 34
Top 5 PCs for $1,500 24
5MP camera for $1,000 19
$2,000 data projector 18
Budget laser printers 104
GeForce FX 5900 29
Best ever real-time strategy game 116

Windows XP 78
How to allocate hard disk space.

Windows 98/Me 80
How to tweak Windows' startup.

Windows NT/2000 82
Working with read-only files.

Linux 83
Control users' access to directories.

Networking 85
The basics of TCP/IP.

Microsoft Office 87
How to index a Word document.

Graphics and design 90
How to fix up your old photos.

Web authoring 92
Improve your Web site's navigation.

Programming 94
Scripting using Game Maker.

Help Station Q&A 98
Answers to all your technical questions.

ENTERPRISE

Laser printers for under $2000 104
We test the latest workgroup and colour lasers under $2000.

reviewed this issue

HARDWARE

4KUS CXR-3X40B 39
A4Tech Petite Cordless Mouse 19
Adrenalin Computers 25
Aiptek PocketDV3100 123
Albatron Gigi FX5600EQ 30
Albatron KM18G Pro 30
AOpen CRW5224WU 36
ASUS CRW-5224A 36
ASUS WLAN WL-300g and WL-100g 18
BenQ CRW5224W 36
BenQ CRW5224WU 40
Brother HL-1870N 108
Brother HL-5040 105
Canon LASER SHOT LBP-2410 109
Canon LBP-1120 106
Canon LBP-2000 108
Canon PowerShot Digital IXUS II 19
Casio CTK-571 112
Casio MZ-2000 114
Casio PL-40R 115
Casio WK-1800 113
Epson AcuLaser C900 109
Epson EMP-S1 18
Epson EPL-6100 109
Epson EPL-6100L 106
Gigabyte Radeon 9800 Pro-TV out 29
Hewlett-Packard Color LaserJet 1500 110
Hewlett-Packard LaserJet 1000w 106
Hewlett-Packard PhotoSmart 935 19
Imation 40x24x40 External CD-RW Drive 40
Imation 52x24x52 Internal CD-RW Drive 38
Intel 865PERL 30
Iomega CD-RW 48x24x48 USB 2.0 Drive 40
Iomega CD-RW 52x24x52 Internal Drive 38
i-Tech AMD Award Series 24
LaCie d2 U&I CD-RW 40
LG GCC-5241P 42
Lite-On LSC-24081MX 44
Lite-On LTC-48161H 44
Lite-On LTR52246S 38
Lite-On LXR-40243A 42
Marvel Computers Performer 2500XP 25
Minolta-QMS magicolor 2300W 111
Minolta-QMS PagePro 1200W 108
Mitsubishi Diamond Data D522452UE-158 42
Mitsubishi Diamond Data DD522452-161 38
MSI 865PE Neo2-FIS2R 31
MSI CR52-A2 42
MSI CR52-M 39
MSI FX5900-TD128 29
PC eXpress Avatar 2600 24
Plus Corporation Astra V43 25
Rock MS-802 5.1 Home Theatre System 123
Roland EM25 113
Roland EM55 115
Roland RD170 115
Sony CRX220A1 39
Targus Noise Reduction Travel Headphones 123
TDK ImaspEaker Mono 123
Yamaha DGX300 114
Yamaha P80 115
Yamaha PSR-1100 114
Yamaha PSR-275 113
Yamaha PSR-350 113

SOFTWARE

Ableton Live 2 57
Acoustica 2.25a 51
Adobe Acrobat 6 22
Alcohol 120% 1.4.3 48
AltoMP3 Maker 3.12 50
AnalogX Collection 60
Antares Microphone Modeler 61
Anvil Studio 57
AOL17 Broadband 20
Arboretum Ray Gun, Ionizer & Restoration-NR 60
AudioEdit Deluxe 2.1c 52
Audiograbber 1.81 50
Baldur's Gate: Dark Alliance 121
Blaze Media Pro 4.10c 48
BloodRayne 118
BurnQuick Data/Audio CD Burner 2.12 48
Cakewalk Loop Libraries 58
Cakewalk Plasma 57
Cakewalk Project5 58
Cakewalk Pyro 2003 52
Cakewalk SONAR XL 2 56
Cool Edit Pro 2.1 51
CSI: Crime Scene Investigation 118
DART XP Pro 52
Diamond Cut FIVE 52
Digital Ear 4.02 62
Dora the Explorer: Backpack Adventure 124
DreamPoint Freeverb 2 61
DrumFlow 1.7 62
DSound Simple Audio Plug-in Pack 1 2.4 61
elby CloneCD 4.2 50
Finale 2003a 62
FreeRIP 2.3 50
GenieSoft Overture 3 62
GoldWave 5.04 52
IK Multimedia T-RackS Plug-in 54
iZotope Ozone 2.0 54
iZotope Vinyl 61
Jay Jay: Sky Heroes to the Rescue 125
Kung Fu Chaos 122
MagicScore 3.3 62
MP3 Workshop 1.8 50
Native Instruments REAKTOR 4 & REAKTOR Session 4 58
Native Instruments TRAKTOR DJ Studio 2 58
Native Instruments VOKATOR 60
Nero Burning ROM 5.5 47
OnlineHomeBase.com 20
Orion Pro/Platinum 3 57
Poikosoft Easy CD-DA Extractor 5.1 50
Poikosoft Power Encoder 1.0 51
PowerPlugs Ultimate Combo 10 Plus 22
Propellerhead Reason 2.5 60
Quartz AudioMaster Freeware 4.6 57
RecordNow Max 4.5 48
Return to Castle Wolfenstein: Tides of War 121
RH32 Mobile Rack 20
Rise of Nations 116
Roxio Easy CD & DVD Creator 6 47
SampleTank 60
Shenmue II 122
Sibelius 2.1 62
Silent Hill 3 120
Sonic Foundry ACID Pro 4 58
Sonic Foundry CD Architect 6 54
Sonic Foundry Loops for ACID 58
Sonic Foundry Sound Forge 6 51
Steinberg Clean 4.0 54
Steinberg Cubase SX 56
Steinberg WaveLab 4 51
The Saddle Club: Willowbrook Stables 124
The Sims: Superstar 120
Tom Clancy's Rainbow Six 3: Raven Shield 117
Tonka: Search & Rescue 2 125
Wave Flow 4.9 52
Waves Native Platinum Bundle 61

AFTER HOURS

Pianos for your PC 112
Make music with a MIDI keyboard and your PC.

Techware 123
We look at the latest in cool tech gadgets.

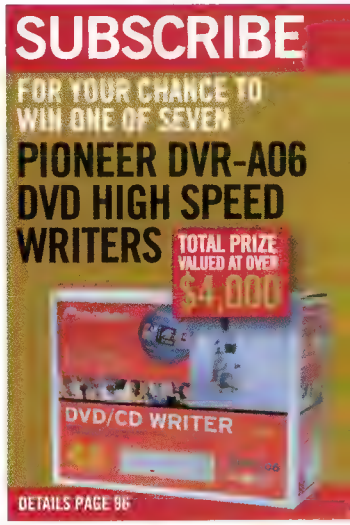
Game reviews 116
We review hot new games for PC and consoles.

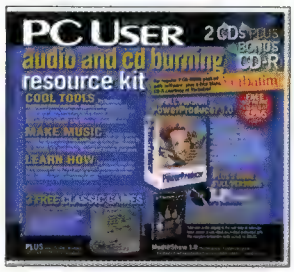
Kids' software 124
New educational titles for children.

Web wanderings 126
The stranger side of Web surfing.

SHOP WISE

Shopping tips 127





EXCLUSIVE TUTORIAL SERIES

This month's CDs include the complete Macromedia Flash 4 training course from VTC. You can purchase any of VTC's 140 other training courses at the special price of $134.95.
Visit www.vtc.com to see more of the company's range, or call (07) 3367 8451 for assistance. Please mention this exclusive *PC User* offer to receive your discount on any VTC training CD.

cd contents

Try the latest burning and direct copy tools, rippers, media players and more in this month's resource kit. We've also included the latest music-making and production tools and audio plug-in effects. Plus, we show you how to extract audio from vinyl, convert and compress audio files, master audio CDs correctly and use music production tools with our exclusive video tutorials.

CYBERLINK POWERPRODUCER 1.0

Want to make your own movie discs? Exclusive to *PC User*, the full version of CyberLink PowerProducer 1.0 (as sold for $60) is yours for free, after online registration.
With PowerProducer, you can burn DVDs, VCDs, Super VCDs or Mini-DVDs, complete with professional-looking personalised menus.

FULLY WORKING

DISC 1

RESOURCE KIT

FULLY WORKING VERSIONS

- CyberLink PowerProducer 1.0
- CFB Software LP Ripper 4.1
- ChordWizard 1.5
- CyberLink Medi@Show 1.0

VIDEO TUTORIALS

- Music keyboards and PC
- LPs to CDs

CD BURNING AND AUDIO SOFTWARE

CD/DVD BURNING TOOLS:

- Blaze Media Pro 4.1
- BurnQuick Data/Audio CD Burner 2.12
- CDRWIN 3.9C
- elby CloneCD 4.0
- GEAR PRO Professional Edition for DVD/CD-RW 6.03
- RecordNow MAX 4.5

AUDIO PRODUCTION AND AUTHORING TOOLS:

- Anvil Studio
- Audacity 1.0
- Cakewalk Pyro 1.5
- Cakewalk SONAR 2.2
- Cool Edit 2000 1.1
- Cool Edit Pro 2.1 with CD-Burning plug-in
- DART XP Pro 1.0
- Diamond Cut FIVE
- FreeRIP 2.35
- GEAR PRO Mastering Edition for DVD/CD-RW/Tape 6.03
- Ots CD Scratch 1200 1.0
- Quartz AudioMaster 4.6
- Sonic Foundry CD Architect 5
- Steinberg WaveLab 4.0
- Synapse Orion Platinum

LOOP AND PATTERN-BASED COMPOSITION TOOLS:

- Ableton Live 2
- ACID PRO 4.0
- FL Studio 4.1
- Native Instruments TRAKTOR DJ Studio 2

SOFT SYNTHS:

- Cakewalk Project5
- Native Instruments REAKTOR 3.05
- Propellerhead Reason 2.5

DX AND VST PLUG-IN EFFECTS:

- AnalogX collection
- Antares Microphone Modeler (DirectX)
- Arboretum Hyperprism 2.5 (DirectX)
- Arboretum Ionizer 1.3 (DirectX)
- DreamPoint Freeverb 2
- DSound Simple Audio Plug-In Pack I 2.4
- iZotope Vinyl 1.5
- Waves Bundles

NOTATION TOOLS:

- GenieSoft Overture 3.1
- MagicScore 3.3
- Sibelius 2.1

AUDIO SEARCHERS:

- BearShare 4.2.5
- iMesh 4.0
- Kazaa Lite 2.1.0
- KaZaA Media Desktop 2.1.1
- LimeWire 3.0.2
- Morpheus 3.1
- MP3-Wolf 1.05
- MP3-Wolf 2.0
- WinMX 3.31
- XoloX Ultra 1.57

PLAYERS:

- RealOne Player
- Winamp 3.0
- Windows Media Player 9

OTHER UTILITIES:

- Awave Studio 8.8
- Digital Ear 4.02
- DrumFlow 1.70
- GrooveMaker 2.5
- IntelliScore WAV/MP3 to MIDI Converter 5.1.1

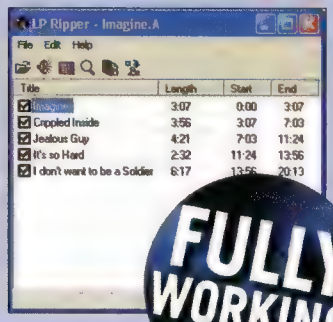
DISC 2

SOFTWARE

ANTIVIRUS SOFTWARE

- Kaspersky Anti-Virus Lite

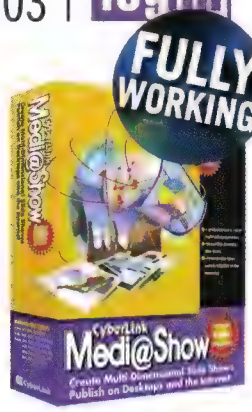
CFB SOFTWARE LP RIPPER



FULLY WORKING

Are you converting your vinyl LPs to CDs or MP3 files? You've probably discovered how time-consuming it is trying to record each track as separate WAV files to store on a CD or to encode as separate MP3 files. Now you can do the job easily with LP Ripper, and it's yours for free this month, thanks to CFB Software (as sold for $65.95).

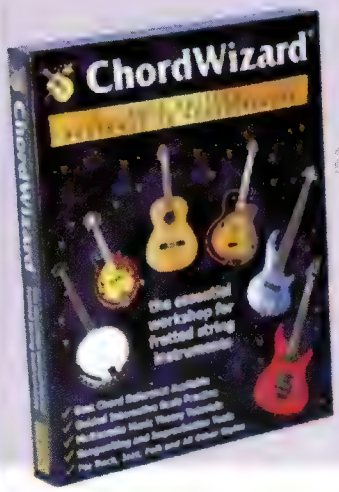
CYBERLINK MEDI@SHOW 1.0



Want to create multimedia slideshows and presentations? With the full version of CyberLink's Medi@Show 1.0, you can make multidimensional slideshows containing images, video, audio clips and even PowerPoint files. Simply register online and the full version of this great program is yours for free, as sold for $70.

FREE CLASSIC GAMES

Take a trip down memory lane this month with our fabulous free classic games: Absolute Mastermind, Airlift Rescue and Tom and Jerry. Plus in our regular games section, Julian Schoffel reports on the most exciting offerings from this year's Electronic Entertainment Expo.



FULLY WORKING

CHORDWIZARD 1.5

ChordWizard 1.5 is the definitive reference for learning to play guitar, bass, banjo and other four, five and six-string fretted instruments. This month, the full version of ChordWizard 1.5 is yours for free (as sold for $49.95), thanks to ChordWizard Software and Drovers Dog distributors.

USING THE CDS

STARTUP

The CDs use a Web-style interface. You only need to install a Web browser to be able to view the contents. If you already have a browser installed, then the CD will autorun (for Win 95/98) and load your default browser at the home page of the CD. If the CDs do not autorun, simply launch your favourite browser and open the page DEFAULT.HTM from the root of the CD. If you don't have a Web browser installed, you can install one from the CD. See the CD case for details.

SYSTEM REQUIREMENTS

The *PC User* discs can be used with any PC that reads DOS-based CD-ROMs. However, we recommend use with Microsoft Internet Explorer 4 or later for Windows, which requires at least a 486 with 8M of RAM. The third-party software on the CDs will often have higher system requirements.

BEFORE USING THE CDS

We've provided installation instructions on the CD back cover, including what to do if you have problems. Please read these carefully before using our cover discs. Also, click on 'Terms of use' on the default page of either disc and read the terms and conditions of use before use. If you agree with the terms, you may continue to use the CD, and this use will constitute your acceptance of the conditions stated. If you do not agree with all of the terms, you may not continue to use the CD and you should return the CD and magazine to us for a refund. We also recommend that you read our Help file, which is available from the default page.

- NOD32

APPLICATIONS

- A4Desk 1.10
- Adobe Acrobat Reader 6.0
- Animated Screen 6.6
- DiveVisions 2.1
- High-Logic's Font Creator Program 4.0
- RovoScape ActiveCandy 3.5

BROWSERS

- Microsoft Internet Explorer 6 with Service Pack 1
- Mozilla (32-bit) 1.3.1
- Netscape 7.02
- Opera 7.11 bundled with Java Runtime Environment

ONLINE TOOLS

- AuctionVision 2.0
- Copernic Agent Basic 6.1
- Cortona VRML Client 4.1
- Free Flash Search Engine 1.0
- Net Snippets 2.6
- SMS4Mail Ping Alert 1.0

SYSTEM UTILITIES

- Add/Remove Plus! 2003 4.0
- DirectX 9.0a
- ExamDiff 1.6i
- OpenExpert 1.4
- PC Doctor OnCall 1.00.0258
- Port Magic 1.0
- Undisker 1.2
- WinZip 8.1 Service Release 1

HANDHELDS

- Cresotech Convert-It 2.15
- Land-J JShopper 1.7
- Little Palm Pet 1.1
- OmniG Software Mini-Sportsbike 1.0
- Pilot Install 4.5.1
- Pocket Artist 2.6
- Pocket Dictate 1.0
- Vista Software PNotepad 1.0
- Wine Master 3.0

ENTERTAINMENT

GAME DEMO

- Colin McRae Rally 3

CLASSIC GAMES

- Absolute Mastermind
- Airlift Rescue
- Tom and Jerry

GAME TRAILERS — E3 RUNDOWN

- DOOM III
- BC
- Commandos 3: Destination Berlin
- Full Throttle: Hell on Wheels
- The Hobbit
- Sam & Max: Freelance Police
- StarCraft: Ghost
- Uru: Ages Beyond Myst
- World of Warcraft

PATCHES

- Enter the Matrix 1.52
- Freelancer 1.1
- Master of Orion 3 1.02
- Rise of Nations 1.01
- Warcraft III 1.06

TUTORIALS

VTC'S TRAINING COURSES

- Macromedia Flash 4
- Network Plus Certification

VIDEO TUTORIAL

- Using disk quotas

MACROMEDIA TIPS

- Director MX
- Dreamweaver MX
- Fireworks MX
- Flash MX

MAG STUFF

BEST INTERNET AUDIO RESOURCES

- KaZaA Media Desktop 2.1.1
- Kazaa Lite 2.1.0
- LimeWire 3.0.2
- MP3-Wolf 2.0
- MP3-Wolf 1.05
- RealOne Player

LINUX

- Firewall Builder 1.0

MICROSOFT OFFICE

- Create a word list
- Word frequency list
- Wurdz

WINDOWS XP HOME

- Using disk quotas

PROGRAMMING

- Game Maker 5.0

Note: Unless indicated otherwise, the listed progams may be shareware or trial versions.

PC USER August 2003
Volume 15 Number 8

Editor
Glenn Rees
Deputy Editor
Anna Raciti
Chief Sub-Editor/Journalist
Gail Lipscombe
Journalist/Sub-Editor
Olga Jevdic
Art Director
David Collins
Graphic Designer
Elinor McDonald
Testbench Editor
Joshua Rodriguez
Assistant Brand Manager
Helen Duncan
Contributing Editors
John Hilvert, Darren Yates
Contributing Writers
Les Bell, Kurt Best, Helen Bradley, Caroline Fox, Link Harris, John Hepworth, Angus Kidman, Philip Moore, Julian Schoffel, Rose Vines, Jan Wikström, Paul Zucker
Web & Database Manager
Dan Lowden
Multimedia Production Editor
Nola Camden
PC User CD Co-ordinator
Laurence Kwek
CD/Web Co-ordinators
Laura Kane, Lachlan Grant
National Advertising Manager
Simon Smith
Sales Manager
Cameron Curtis
Advertising
Jodie Etchells, Jules Flakelar, Laura Wood, Sumit Roy
CEO
John Alexander
Group Publisher
Jill Baker
Senior Brand Manager
Mark Harrison
Advertising Director
Andrew Cook
Production Controller
Joseph Kenworthy
Advertising Production
Susan Harrison

Australian PC User is printed every month by ACP Tech, a division of ACP Publishing Pty Limited ACN 053 273 546. Printed by Hannanprint Pty Ltd, 55 Doody Street, Alexandria. Distributed by Network Distribution Company, 54 Park Street, Sydney NSW 1028. Material contained within *Australian PC User* is protected under the Commonwealth Copyright Act 1968. No material may be reproduced in part or in whole without written consent from the copyright holders. All rights reserved. Subscription rates (surface mail in Australia): one year (12 issues) $70, two years (24 issues) $130. See page 96 for details.

How to fight pirates

Vendors should try talking to them first, says Glenn Rees.

Let's face it — piracy is rife. I'm not talking about harmless but strictly illegal practices such as making a compilation disc from audio CDs that you've bought. I'm talking about real piracy in which some form of technology is used to avoid paying for music, movies, games or software — or to distribute that content illegally to other people.

Perhaps people are sick of exorbitant prices for software and games, and being forced to pay music and movie royalties a number of times. But there's no doubt piracy is wrong — you know it and I know it — so why is it so widespread? Why do people, who wouldn't dream of shoplifting, feel so free to do the digital equivalent?

That's a question I'll leave you to ponder, but what I find just as intriguing is the copyright owners' reaction to piracy. Perhaps understandably, their reaction has been to bring in the lawyers as much as possible. But I reckon they could learn how to fight piracy by talking to the pirates themselves.

I did a quick (and anonymous) poll and it supported my theory that people who download a lot MP3 files still buy a lot of music CDs. In fact, most said that being able to sample MP3s actually gave them more incentive to buy music CDs.

It all comes down to the quality. If, after sampling MP3s, people discover an album is lousy, they won't buy it. But if it's good, they'll generally buy the CD, because the audio quality is better and, well, they just like to have the commercially produced package as a collector's item.

The same applies to movies. Downloading a movie generally doesn't stop a person from going to the cinema to see that movie or renting the movie later — if it's a good movie, they want to see it again on the big screen, or with the better picture and audio quality you get with a legal DVD. They'll even buy the DVD if it's a great movie or popular TV series, especially if the vendor has put some effort into the DVD (for example, lots of bonus material such as interviews and outtakes).

In other words, music and movie makers can compete against free, pirated versions of their own content — if they lift their game.

Games and software vendors face a different problem, quite often of their own making — high prices and unfair licensing agreements are the main disincentives for buying software (although at least they offer significant discounts for upgrades, unlike music and movie makers who make you pay the full price, even if you've bought that content previously in another format).

Don't get me wrong. I'm not saying that copyright owners aren't entitled to fight piracy with everything they've got. But at the moment, they're losing the battle, so I reckon they should consider this novel strategy: stop churning out so much rubbish and give us more good music, movies and software. And stop treating buyers like mugs.

Stop charging an arm and a leg for software and new games. Offer fairer licensing deals for very small networks and users who use more than one computer. Offer 'upgrade' prices for customers who have already bought an album or movie before, either on another medium or a disc that has broken.

You never know, by offering good content at the right price, people might actually buy more products. PCU

NEXT MONTH

Everyone hates spam — not to mention viruses, spyware and adware. In this special edition, we provide a comprehensive guide to protecting your system from these and other threats and annoyances on the Net. That's as well as all our regular Help Station tutorials, upgrade report, reviews of PC and home entertainment products, plus more goodies in our regular two-CD pack.

HOW TO CONTACT US

Subscriptions and back issues: Phone 13 61 16 (Monday to Friday 8am to 8pm, Saturday 8am to 6pm). Email: magshop@acp.com.au. Web: www.magshop.com.au.

CD support: Email: pcusercd@acp.com.au. See full technical support details on the CD back cover.

Reprints and copyright: Helen Duncan (02) 9288 9105.

Other editorial and marketing enquiries: Phone: (02) 9288 9105. Fax: (02) 9267 4909. Email: pcuser@acp.com.au.

Advertising enquiries, NSW: Simon Smith (02) 9288 9107. Email: spsmith@acp.com.au. **Victoria:** Sumit Roy (02) 9288 9143. **Queensland:** Noel Fitzpatrick (07) 3000 8500. **South Australia/Western Australia:** Arnoul Media Services (08) 8361 9999. **Shop Wise/Classifieds:** Jules Flakelar (02) 9288 9158. **Material:** Susan Harrison (02) 9282 8688.

Postal address: PC User, GPO Box 4088, Sydney NSW 1028.

Street address: Level 9, Stockland House, 175-183 Castlereagh Street, Sydney NSW 2000.

Courier dock: 197 Elizabeth Street, Sydney NSW 2000.

Web: www.pcuser.com.au

THE POSSIBILITIES ARE INFINITE

FUJITSU

Wireless mobility with superior multimedia

LifeBook P5010

Intel® Centrino™ Mobile Technology

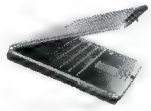
• Intel® Pentium® M processor 900MHz (Ultra Low Voltage) • Intel® PRO/Wireless 2100 Network Connection • Intel® 855GM Chipset • 256MB SDRAM (max. 512MB) • 40GB HDD • 10.6" Wide Super XGA TFT • Combo Drive (DVD & CD-RW) replaceable with options • Approx. 1.70kg

Wireless corporate firepower

LifeBook E4010

Intel® Centrino™ Mobile Technology

• Intel® Pentium® M processor 1.60GHz • Intel® PRO/Wireless 2100 Network Connection • Intel® 855GM Chipset • 512MB DDR266 (max. 1024MB) • 60GB HDD • 15" Super XGA TFT • Combo Drive (DVD & CD-RW)

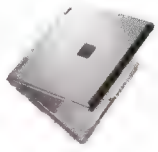


Slim and wireless modular bay

LifeBook S6120

Intel® Centrino™ Mobile Technology

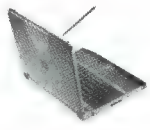
• Intel® Pentium® M processor 1.60/1.40GHz • Intel® PRO / Wireless 2100 Network Connection • Intel® 855GM Chipset • 512/256MB DDR266 (max.1024MB) • 40/30GB HDD • 13.3" XGA TFT • Combo Drive (DVD & CD-RW)/CD-RW Drive • Approx. 1.75kg



All-in-one multimedia

LifeBook C2220

• **Mobile Intel® Pentium® 4 processor - M at 2.40/2.20GHz** • 256MB DDR266 (max. 768MB) • 40/30GB HDD • 15" Super XGA+/14.1" XGA TFT • Wireless LAN/Optional Wireless LAN • DVD-RW/CD-RW Drive



Touch screen with rotational display

LifeBook B2620

• **Mobile Intel® Pentium® III processor 850MHz - M (Ultra Low Voltage)** • 256MB SDRAM (max. 256MB) • 30GB HDD • 10.4" XGA TFT Touch Screen

All in your own handwriting

Stylistic ST4121/ST4120

• **Mobile Intel® Pentium® III processor 933MHz - M (Ultra Low Voltage)** • 256MB SDRAM (max. 768MB) • 40GB HDD • 10.4" XGA TFT Colour • Active Digitiser • Integrated Wireless LAN • Approx. 1.50/1.48kg • Microsoft® Windows® XP Tablet PC Edition

LIFEBOOK
Made in Japan. World Class.

STYLISTIC

lifebook.com.au

1800 288 283

intel inside
centrino™
MOBILE TECHNOLOGY

FUJITSU PC AUSTRALIA

Registered business name of Fujitsu PC Asia Pacific Pte Ltd ARBN 098 263 195

Fujitsu recommends Microsoft® Windows® XP Professional for Mobile Computing

Wireless connectivity and some features may require you to purchase additional software, services or external hardware. Availability of public wireless LAN access points limited. System performance measured by MobileMark® 2002. System performance, battery life, wireless performance and functionality will vary depending on your specific hardware and software configurations. Intel, Pentium, Intel Inside logo, and Intel Centrino are registered trademarks or trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. All product information is correct at time of printing.

FJT0083

Bring back the desktop case!

With desk space at a premium and more peripherals than ever before, Darren Yates says its time to bring back the old PC case.

How's your computer desk? If it's anything like mine, you're fighting your technology for space. Scanners, printers, phone, speakers, keyboard, mouse — the list of bits all conspiring to move you out seems almost endless.

But here's another question: how do you enjoy connecting up all of those bits? Again, if your desk is anything like mine, then connecting this stuff is a real pain in the bum! And what makes it all increasingly more difficult is the tower case.

It might have been a great idea in the mid-1990s, but I'm happy to have on record that I reckon the tower case is an impractical design whose time has long since past. Why? Tower cases were originally designed to either sit on the floor next to the desk or on the desk alongside the monitor. Either way, it's a problem. If it's on the floor next to the desk, forget about plugging peripherals in, particularly those using USB or FireWire connections.

And that's what I meant about tower cases being great in the mid-1990s, but not now — back then, we had few peripherals that were anything but anchored to the PC. Today, USB and FireWire peripherals are everywhere from digital cameras to DVD burners.

ILLUSTRATION: DAVID COLLINS

And connecting these to front-panel ports on a tower case sitting on the floor is a joke, even if the cables are long enough to reach. But then, if you sit the tower case on your desk, it actually takes up more room than the desktop case they were seemingly designed to replace. I'm a real convert back to the desktop case design as it holds truckloads of benefits. By no means the least of these is the fact that you can sit your monitor on top of it.

The problem many of us taller blokes face is we crane our necks over to look at a monitor sitting on the desk. Placing it on a desktop case gets the centre of the screen back to eye level, a key ingredient many physiotherapists say is important for good posture and reducing back and neck pain. There have been plenty of studies showing back pain and back issues cost our economy millions of dollars in lost productivity every year, so bringing back the desktop case can contribute to some very good long-term health benefits.

Placing the monitor on top of the desktop case also adds virtually nothing to the desktop footprint, but has the added benefit of bringing USB and FireWire peripheral ports within easy reach. As one reader pointed out to us this month, those with back problems already have trouble accessing these ports on tower cases seated on the floor.

However, the problem now is that vendors are going too far the other way. There's a growing number of 'mini PC' bare-bones boxes now arriving in Australia. Yes, they're cute and everything, but on the whole, the more I think about it, the more I see that they're pretty useless.

The two I reviewed in last month's issue easily highlighted the problems. Designers have worked so hard to make these cases as small as possible that little thought has been given to airflow considerations — a tiny power supply, a Pentium 4 processor with a fan and virtually no airflow isn't a good long-term recipe. If you make the box a little bigger, add in every port under the sun and then charge $600 for it, again, it is still a box with too small a power supply and a motherboard that's an upgrader's nightmare.

These micro motherboards may become popular in the future, but at the moment, they're not great exponents of the art of high performance, especially the VIA 'silent PC' motherboard, where the built-in processor performance is so woeful, it's no better than what we saw three years ago.

All of these facts show it's time to bring back the old desktop PC case. If the desktop PC is to continue to be the most affordable computing backbone of home and business, we need to get it back on the desktop where it belongs. Then, we might just have a chance of taking back control of our desks. PCU

BWMLGE0062C/APCU

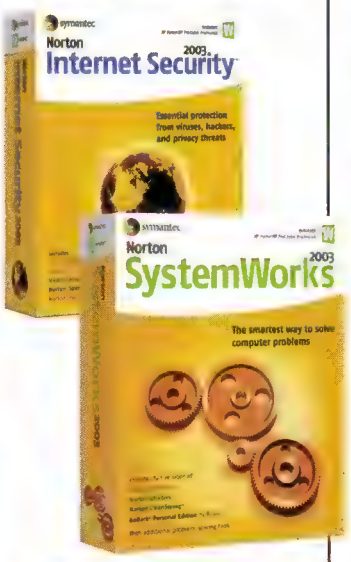
THIN IS BEAUTIFUL

At less than 10 centimetres thick, the only thing the LG Flatron LCD computer monitor is big on is superior picture quality. Available in 15, 17, 18, 20, 22 and 30 inch sizes. www.lge.com.au

LG

Life's Good

LETTER OF THE MONTH



This edition's Letter of the Month winner receives Norton Internet Security 2003 and Norton SystemWorks 2003, thanks to Symantec. Internet Security provides essential protection from viruses, hackers and privacy threats, while SystemWorks is the smartest way to solve computer problems. Each program is valued at $149.95.

Great recovery tool

Watching Darren Yates' video on retrieving data from a faulty hard disk on the July 2003 cover disc of *PC User* prompted me to share with you and your readers my experience on this matter a few months ago, and the process I followed to recover all the files.

My computer is a Pentium II running Windows 98. I have two hard drives, with the second used to hold programs downloaded from the Internet prior to installation. I also keep passwords, serial numbers photos and other important data on this disk. I was using the Windows 98 program ScanDisk to check the drive. I opted for the program to fix errors found. This resulted in a total loss of access to all data on the drive. Needless to say, I was devastated and anxious to recover my drive information.

My first step was to contact a local computer repair shop. This person advised that he did not recover data from failed drives. He referred me to another company. This second company charged me $20 to check my computer and advised me that the data was irretrievable unless I was prepared to fork out big bucks.

My belief was that although I could not see or access the files, they should be basically intact.

Searching on the Net for **"recovery of drive data" +free download** gave me plenty of responses. Most programs would only tell me that the files were present, but I would have to pay for recovery — like send the drive to the US.

Then, along came a little beauty, and what's more, it's freeware! The program is PC Inspector File Recovery from **www.pcinspector.de**.

This program was installed on my C: drive (having a good remaining hard drive on my PC was a godsend). There is a good help file to get you going.

With this program, I was able to find and copy all files from my D: drive to C:. I can recommend this program to every reader. I believe that partition and FAT information was corrupted by the use of ScanDisk. I will be very reluctant to use it to fix found errors in the future.

Bill Metcalfe
Mount Pleasant, Qld

■ The writer of the best letter to *PC User* each month wins a prize. Just send your letter of no more than 300 words to *PC User* (see 'How to contact us', page 10), and please include your postal address and daytime telephone number. Entry is open to all residents of Australia other than employees of ACP Publishing. Entries for the October issue close on August 8. The judges' decision is final. All entries become the property of ACP Publishing.

Industry arrogance

As a TAFE student studying IT, it continues to incense me when attempting to find information, such as licencing costs, which is required for assignments.

One would think that companies would be falling over backwards to create a rapport with people who will be entering the IT industry, in the hope that the satisfactory liaisons would encourage their company to be considered for minor and major purchase choices in the future. But that is simply not the case, with company after company (Microsoft included) refusing to provide information. At one stage, I was told by a major retailer that it was a sales service, not a university.

This obviously highlights that the prime concern is money, and they have little regard for developing customer relations or attracting new customers.

Of course, I could always pretend to be a customer who wants to buy mega amounts of stuff, then I would have all the information I need thrown at me. Sorry, I deal in honesty upfront.

Needless to say, there is one major retailer who will never get a red cent from me because of its attitude to students. I deal with humans that have respect, not arrogant animals who couldn't care less.

Mark Watson
Internet

What month is it?

When is the July issue not the July issue? When it arrives in the mail on June 6.

While your individual writers strive to present accurate detail, the magazine seems to take quite a lackadaisical approach to the naming of each issue.

What is the point in naming an issue 'Collector's Edition'? Does this then relegate all the others to 'throw-away' editions? Oh, hang on, now I'm beginning to see the light, the cover date is when you throw the magazine away.

Pity really as the content is very good, the editorial strong, and the ads are down the back.

But I guess I'm now resigned to keeping only the one Collector's Edition per year.

There seems no point in having a subscription, actually — have to review this next time it runs out, but when is that? There are no clues on the mailing slip about the 'date' of my last issue. The subscription department, bless their cotton socks, seem quite perplexed when asked how many issues remain. "Six to go!" they finally say with glee. From when? June, July, real month or magazine month?

All is not lost, though, as I have a solution. Drop the subscription and buy the July magazine in July at the newsagent, then I don't need to throw it away.

Shane Wilkins
Bullarto, Vic

Early delivery

This issue has be raised before, so here we go . . . Come on guys, it's June 4 and I have the July issue. Now, I gather that it takes about a month or so to prepare the mag and get it printed, and so on. Then you send it to me almost one month ahead, which makes me wonder if what you wrote about two or so

CORRECTIONS

In the July issue we listed the priced of the Mustek DV3000 as $399. As we went to press, Natcomp Technology dropped the price to $299. *PC User* apologises for any inconvenience.

months ago is still relevant by the time I get it.

I know you are trying to get this magazine out before the rest of the computer mags, but I don't particularly care about them, which is why I subscribe to this magazine (and have done so since you started). This is getting all out of sync. It says 'July' issue, but it's only just turned June.

Just last month, I approached one of your advertisers for a product and they informed me that the price quoted was different because it was placed months ago. Lucky for me it was cheaper.

So, please slow down your eager delivery and let us have the month's issue only a week or so early.

Joseph Bajada
Internet

Believe it or not, your email is good news for us, because it confirms that subscribers receive their copies of PC User *before newsagents. The official retail onsale date for the July edition was June 9 and we've worked very hard to ensure subscribers receive their copies before this date!*

The retail onsale date is almost always the second Monday of the month before the cover date. I know that's very early, but with most of our competitors coming out in the same week, my hands are tied. I guess we're a bit like commercial TV news — they wouldn't push their news back after 6pm, because they'd lose viewers.

However, apart from the date on the cover, there is no impact on readers. All advertisers and companies submitting evaluation products are made aware of the onsale period. By law, advertisers are committed to the advertised price for the duration of the retail onsale period, although I guess no-one minds if the price drops! However, that obligation ceases once a new edition comes on sale.

— Editor

Keep your hard drive

I refer to the article 'Second-hand PCs' by Darren Yates in the June 2003 of *PC User*. I disagree with Darren when he says that older hard drives are suspect and a person buying a second-hand PC "may want to consider replacing the hard disk drive as soon as you get it with a brand-new (and likely) more reliable model".

It's been my experience that older hard drives are much better quality and seem to last much longer. I suppose that with drives getting bigger and faster and prices dropping, something has to give. I think that that something is quality.

Ten years ago, I bought a 486 with a Conner 170M drive, then added a Conner 200M drive. About a year ago, I gave that computer to a neighbour's 10-year-old son. At that time, both these drives had been running for nine years with no problems. Eight years ago, I bought a machine with a Maxtor 1.2G drive. That drive is still running, also wihtout any problems.

In the last five years, every drive I've bought has had trouble: a Quantum 5.1G drive was replaced twice under warranty; a Quantum 20G was replaced twice in the first year. My current computers have Seagate 40G and Maxtor 20G drives, both of which have so far been replaced once each under warranty.

My advice to second-hand computer buyers is: if the drive is working, keep it as long as possible; you'll probably never buy one as good.

George Ayton
Manjimup, WA

Thanks for the support

I have just finished reading the ink off the June 2003 edition and am yet again convinced this is the best mag on the block.

Many thanks to you for the copy of the Windows 98 updates and Rose Vines' excellent article on how to put them all together for future use.

May I just add that another very useful process with regards to the formation in the Windows 98 Survival Kit is to include a printout of the Installation History of these updates for your PC.

All you need to do is to go to the Windows Update site, make sure you have all the current updates downloaded and installed, and then click on View Installation History. Next click on Edit —> Select All and then Copy and Paste to a text editor, then print.

You now have a printed copy of all the Microsoft Windows 98 updates that have been installed on your PC and this copy contains the article numbers, names and dates of the updates, which in the event of a reinstallation of the operating system in the future, will let you know exactly what Updates were installed originally.

Many thanks for a great mag.

Larry Foley
Alexandra Hills, Qld

A simple thank you

I just read your June issue and was quite interested in your review of desktop PCs and their prices. As someone who's just bought a machine, it helped me quantify the value of my PC after the excitement of the initial purchase had worn off.

What I really wanted to say was don't discount the smaller service provider. I originally decided that the big-name brands would be too expensive for my system requirements, so I was approaching smaller shops, knowing that they would be competitive on price, put the system together and would provide me with a place to come to with my problems.

I had written in to the magazine last year, outlining some of my confusion and frustration at the level of service I was getting, and I was contacted by one of your subscribers who was in the business of providing computing hardware and service, and he asked if he could quote me on a system.

He provided me with a professional quote, was able to ease my fears when it came to warranty and support, and basically gave me the best service out of all the businesses I've dealt with.

My Leadtek A280 graphics card had been the cause of the problem and these guys swapped the card with a temporary replacement to keep me shooting on UT2003; Leadtek is assessing my graphics card now. I just wanted to say thank you to Value Plus Computers.

Russell Tindall
Hillarys, WA PCU

READER LETTER

Be secure

Recently, I installed Norton Internet Security on my system. I previously had an antivirus program and a firewall installed, but the Norton program seemed to give more options, including privacy and parental control. The parental control is a good thing, especially considering that my 10-year-old daughter was recently looking for Avril Lavigne's Web site and typed in a URL that she thought might be correct only to get a big surprise (and I got an even bigger one!).

It is actually the privacy control that has proved to be the most interesting part of the program. In only a couple of weeks since I've installed it, my computer has attempted to send my credit card information over the Internet without my knowledge three separate times, making at least five attempts to send the information each time. This is scary!

Moral of the story: you need to cover all areas of Internet security, not just protect against viruses. You just don't know who you can trust out there!

Kylie Russell
Internet

SUBS WINNER

The lucky winner from the June subscription promotion is G J Kelly of Wantirna South, Vic. Mr Kelly has won a Marvel Legend 2700 Deluxe PC, valued at $3,695.

Dodgy deals or just simple mixups? Anna Raciti takes a closer look at reader complaints.

Who is responsible for technical support?

READER COMPLAINT Recently, I started looking for a new ISP. I am a pensioner, and I'm often on the lookout for bargains, so when I saw an ISP that offered a cheap $19.95 per month rate, I decided to give them a go.

After signing up, I found out that POP email was not included, just Web-based email, and only 1M worth. Why was I not informed that the email component of the service would be so limited? If I'd known, I would not have signed up. Would I be able to get out of my year-long contract with them because I was not informed of this?

But this is not the extent of my problems. I soon realised that 1M was not enough, so I decided to 'upgrade'. The company offered POP email and a 25M mailbox for an extra $US20, so I took that option.

When I next tried to use the service, I found I could not set up the POP-based email, even following the company's instructions to the letter. Even my son, a computer technician, tried to set it up to no avail. If I go into the Web-based mail, my mailbox is now 25M in size — and yes, my credit card has been charged.

I've tried to contact the local ISP about this, but I've been told that there is only one person who can help me with the problem — alas, that person is never in when I call and will not return my messages! I've tried solving the problem online, but when I'm asked to enter my email and password for technical support, I get a message saying that there is no such user!

Colin
Camden, NSW

CONTACT READER REPORT

Have you been a victim of poor customer service or support? We'd like to hear about your problems and try to resolve them. Send a letter of no more than 300 words to pcuserreport@acp.com.au or address your letter to Reader Report, GPO Box 4088, Sydney NSW 1028. Please include a daytime contact phone number.

There is good news and bad news for our reader. We did some digging around and found that the full details for his plan were freely available on the ISP's Web site. It clearly mentions that the plan comes with Web-based email, so the ISP can't be accused of hiding this. There's no reason to cut short the contract period on those grounds.

When we received Colin's letter, we were confused as to why a local ISP was charging a US dollar rate to upgrade a customer's email package — until we found out that the ISP outsources Web-based email to a US Web email provider. It is this outsourcing issue that makes this case more complicated than it might otherwise have been.

The US company emailed Colin offering him an 'upgrade' package. When Colin took up the offer, he effectively entered a separate contract with the US provider.

If something had gone wrong with the basic mail service that came with the local ISP's plan, they would have been obliged to fix the problem. However, when Colin paid to take on the special offer, the local ISP saw any technical support problems that arose as an issue between Colin and the US provider. Technically, there was not much the local guys could do about Colin's problem, so they felt justified in washing their hands of it.

The good news for Colin is that even though the problem lay with the US provider and could only be resolved by them, the local ISP has a duty to provide a reasonable level of customer service. They are responsible for working with their US partners to resolve customers' problems.

When we contacted the ISP and told them we intended to run this story, they decided to contact the US provider on Colin's behalf. The problem has now been fixed.

PC USER AUGUST 2003 SUBSCRIPTIONS PROMOTION TERMS AND CONDITIONS OF ENTRY

■ Information on how to enter and prize forms part of these conditions of entry. ■ Entry is open to all residents of Australia who subscribe or renew their subscription to PC User between 14/07/03 to 10/08/03. Entry is automatic upon and subject to the correct use of a valid credit card or, if payment is made by cheque, the cheque must be cleared for payment. Subscriptions are to be sent by mail to PC User, Reply Paid 3357, Sydney, 2001; or made by telephone on freecall 13 61 16 or via the Internet at www.magshop.com.au. Employees of the Promoter and their immediate families and agencies associated with this promotion are ineligible to enter. Only one entry per person per subscription. ■ Promotional period commences 14/07/03 and closes 23:59 EST on 10/08/03. The draw will take place at 11am EST at the Promoters premises on 13/08/03. The winner will be notified by mail or telephone (using contact details provided in the subscription) and their name will be published in the Public Notices section of The Australian on 20/08/03. Judges' decision is final and no correspondence will be entered into. ■ The first seven valid entries drawn will each win a Pioneer DVR-A06 DVD High Speed Writer, valued at $599 each. Total prize pool $4,193. Prize is not transferable or exchangeable and cannot be taken as cash. The Promoter is neither responsible nor liable for any change in the value of the prize occurring between 10/06/03 and the date the prize is claimed. ■ The Promoter may conduct such further draws at the same place as the original draw as are necessary on 15/12/03 in order to distribute the prize if unclaimed by that date subject however to any written directions given under Reg 37 of the Lottery and Gaming Regulations 1993 (SA). In the event of a winner in the unclaimed prize draw their name will be published in The Australian on 19/12/03. ■ The Promoter shall not be liable for any loss or damage whatsoever which is suffered (including but not limited to indirect or consequential loss) or for any personal injury suffered or sustained in connection with the prize except for any liability, which cannot be excluded by law. ■ The Promoter accepts no responsibility for late, lost or misdirected entries. The Promoter accepts no responsibility for prizes damaged in transit. ■ All entries become the property of the Promoter. ■ The collection, use and disclosure of personal information provided in connection with this competition is governed by the Privacy Notice (see contents page for location in this issue). ■ The Promoter is ACP Publishing Pty Ltd (ABN 18 053 273 546) of 54 - 58 Park Street, Sydney, NSW 1028. ■ Authorised under NSW Permit No TPL03/06013 ACT: TP03/2442 SA T03/ 2307 NT: NT03/2186

PRIVACY NOTICE

This issue of *PC User* published by ACP Publishing Pty Ltd (ACP) may contain offers, competitions or surveys which require you to provide information about yourself if you choose to enter or take part in them (Reader Offer). If you provide information about yourself to ACP, ACP will use this information to provide you with the products or services you have requested, and may supply your information to contractors that help ACP to do this. ACP will also use your information to inform you of other ACP publications, products, services and events. ACP may also give your information to organisations that are providing special prizes or offers and that are clearly associated with the Reader Offer. Unless you tell us not to, we may give your information to other organisations that may use it to inform you about other products, services or events or to give to other organisations that may use it for this purpose. If you would like to gain access to the information ACP holds about you, please contact ACP's Privacy Officer at ACP Publishing Pty Ltd, 54-58 Park Street, Sydney, NSW 2001.

Fee for a reinstall?

READER COMPLAINT I have recently encountered what must surely rank as the most outrageous yet 'grab for cash' by a software vendor — Quicken. They have introduced a $9 charge to 'reregister' software.

Having decided to upgrade my OS to Windows XP, I decided to start from scratch with a nice, clean hard drive, and then reinstall my software, which includes Quicken Personal Plus. The catch is that each time Quicken is installed, the program generates a different installation 'key'. The program can then only be used by obtaining the matching serial number from Quicken. Meaning, of course, that each time the owner wants to do some spring cleaning and reinstall the software, Quicken demands $9 for the right to continue using software you have already bought and paid for.

If Quicken wishes to put in place security measures to protect its software from illegal use, then that is their business. But why penalise the legitimate users in the process? To my mind, this charge borders on extortion.

Mike Elliott
Internet

VENDOR RESPONSE **In all cases where the need to reregister is the result of a decision made by the customer (for example, they decide to buy a new computer and reinstall the software on it), there is a fee of $9.**

If the need to reinstall software was caused by something beyond the customer's control (such as a crashed hard drive that had to be replaced), the customer should check to see if such an event is covered by his or her insurance policy, and if it is, then the insurance might cover the cost of reregistration.

There are a number of instances where the fee for reregistration of software does not apply, such as:

- **Incorrect installation when one has just purchased/subscribed to the product**
- **When a customer is upgrading from an older version to the latest version of our software**
- **When a customer is renewing their subscription to a product (ie. effectively renewing their annual 'lease' of the software)**

In essence, the aim of this policy regarding reregistration is to minimise piracy — be it unintentional or intentional.

When customers reregister software, there are several checks made by Quicken Australia that are required during the reregistration process. We charge the nominal amount of $9 to recover the cost of these checks.

John Kingsley-Jones
Public relations manager
Quicken Australia

More exploding CDs

In the reader report section of *PC User*'s April issue, we reported on problems many consumers were experiencing with CDs exploding in relatively new, high-speed CD drives. The letters have not stopped flowing in from other readers who continue to experience similar problems. One such reader is Sue Atkins who says she is fortunate to have received her money back when her CD drive stopped working after shattering a disc.

READER LETTER I read with interest the articles you carried on 'exploding CDs' (April 2003 issue), as I have recently had a nasty experience with this myself. I bought a brand-new burner and only did one backup with it. When I went to reinstall a driver, the cover was blown off the front of the burner and bits of shattered disc were blown around the room! I contacted the company who sold it to me, who said "no worries, return it — it is under warranty". So I mailed it back to the supplier, who then took it back to the distributor only to be told "sorry, we will not cover it" because it was customer-induced damage!

I then contacted the makers of this burner directly and wrestled with them over it, and got no satisfactory results until I mentioned the Department of Fair Trading and writing to all the computer magazines.

Yes, they have now replaced the burner, ever so reluctantly.

Sue Atkins
Sydney, NSW PCU

AD INDEX

Acer	2, 3, gatefold, 33
ACO	134
Activision	119
Altech	136
American Power	65
Anyware Computers	139
ARC	132
Belkin	21
Brother	27
Canon	OBC, 4, 5
Corporate Software	128, 129
Creative Labs	IBC
Dell	OFC, gatefold, 1
Dodo Internet	49
Epson	37
Fujitsu	11
Gigabyte	53
HP/Compaq	107
LG	13
Maxtor	59
MicroGram	133
Netgear	41
Netspace	55
New Reality	130, 131
Ozzieweb	138
Paramount	17
PC Range	43
PowerQuest	45
Rectron	135
Server 101	101
Sony	23
Swann	137
Websale	140

Price breakthrough

The *PC User* team tests a variety of PC hardware and software, including the first projector under $2,000 and first 5-megapixel camera under $1,000.

Epson EMP-S1

RATING 9 **Price:** $1,995; 2,000-hour lamp, $349 **Contact:** Epson **Phone:** (02) 8899 3666 **Web:** www.epson.com.au ✔ First sub-$2,000 projector ✔ SVGA resolution ✔ Low-cost, long-life replacement lamp

If rear-projection TVs were in trouble before, they're in dire straits now with the release of Epson's new budget data projector. The EMP-S1 is the first projector under $2,000 and although replacement lamps cost $349, that's considerably better than the $700 to $1,000 you'll typically pay for many other units.

Brightness is rated at 1,200 ANSI lumens, which is typical for most entry-level models. In our well-lit *PC User* Labs with a throw distance of 3m, there was sufficient brightness to handle bright, vivid scenes of a DVD movie, and certainly enough to handle visual presentations in a boardroom scenario. Obviously, you'd have the room lighting dimmed for a DVD movie and here, the EMP-S1 would have no trouble at all.

The trick is not to make the image so big and sit so close that it makes the individual pixels look as big as a postage stamp. Its basic resolution is 800 by 600 pixels, which is enough to handle DVD movies. The unit has a manual focus control and a digital zoom function, but the zoom range variation would be lucky to hit 20%.

With composite-video, S-Video and VGA connection ports, you shouldn't have any trouble connecting your PC, notebook, VCR or DVD player. There's a mono (one-channel) 1W RMS amplifier with a built-in speaker, but for DVD movies, we recommend a 5.1 surround speaker system or at least a very good hi-fi stereo system. It accepts a stereo input via two RCA sockets, but you only get mono out. It also features a VGA monitor-out port for personal viewing on a separate monitor in a presentation, for example.

1 PC USER TOP BUY

First sub-$2,000 data projector: Epson EMP-S1

You can control the EMP-S1 remotely either via a serial port mouse or the infra-red remote included in the package. Menu control is good, with a built-in lamp-hour counter to help you keep track of when you need to order a replacement.

Adjustable front feet let you set the image height correctly and vertical keystone ensures the image is perpendicular, despite any angle of projection, up to 15°. There's no horizontal keystone, but few projectors under $5,000 have that.

The key to choosing the right model isn't just in the projector, but also the replacement lamp costs. Epson's $349 replacement cost for a 2,000-hour bulb is the best price we've seen so far by a long way. You should get about 1,000 movies out of a lamp, each roughly costing 39 cents.

For home entertainment or business use, the EMP-S1 is a winner.

— Darren Yates

Easy installation: ASUS WL-300g WLAN Access Point

Good range and performance: ASUS WL-100g WLAN Card

ASUS WLAN WL-300g and WL-100g

RATING 9 **Price:** $359 (access point), $199 (card) **Contact:** Core8 Information Australia **Phone:** 03 9642 2988 **Web:** www.asus.com ✔ Supports 802.11g and 802.11b and 802.11g ✔ Easy installation ✔ Good range and performance

The WL-100g WLAN Card fits into a PC-Card slot on a notebook and has a pivoting antenna to enhance signal strength, while the WL-300g WLAN Access Point stands vertically on a desk and has an internal diversity antenna. There is also a socket for an optional external antenna. The unit can operate as an access point and/or a bridge, linking multiple wireless networks. The card and access point support 64 and 128-bit WEP encryption for security, and the access point also has MAC address filtering. A discovery utility is included with the access point for easier identification across a LAN. It also gives you access to the unit's comprehensive onboard configuration Web page. The range is good and as the distance between the access point and card increases, the signal strength and link speed decreases. As with any radio equipment, RF-absorbent material such as walls and furnishings also reduce range and speed. In a domestic situation, with low RF noise, we got 54Mbps links up to 15m, even with a brick wall between the access point and card. At about 30m, with several walls, the link speed dropped to 11Mbps — about the same as 802.11b equipment in the same position. As the range increased further, signal strength and link speed for both 802.11g and 802.11b fell at about the same rate.

— John Hepworth

First 5-megapixel camera under $1,000: HP PhotoSmart 935

Hewlett-Packard PhotoSmart 935

RATING 9 Price: $1,099 Contact: Hewlett-Packard Phone: 13 13 47 Web: www.hp.com.au
✔ 5 megapixels ✔ 3X optical zoom ✔ 32M SD card included

With a retail price of $1,099 and a street price under $1,000 (on the Harris Technology Web site), the PhotoSmart 935 is the cheapest 5-megapixel digital camera that we've reviewed. It's an impressive unit, too.

It doesn't really matter how many pixels your camera has if it doesn't have a decent lens, and the 3X optical Pentax glass lens on this unit looks to be a ripper. At the highest quality setting, the image quality is excellent. While it does exhibit some noise in low-lit or shadowed areas, image lighting was considerably more accurate than the Canon Digital IXUS II. So, too, was the colour balance.

Images up to 2,608 by 1,952 pixels in resolution are stored in JPEG format on SecureDigital (SD) flash memory, with HP kicking in a 32M card to start you off. It can also capture video at 15fps in MPEG format, but the resolution is a fixed 288 by 208 pixels, up to a length of two minutes.

Focusing is automatic and split into two regions, as with the Canon — normal from 50cms to infinity, and macro down to 14cm. The 1.5in LCD at the rear allows you to set many of the camera's capture and playback settings via the joystick control button.

The 935 is physically larger than the IXUS II, but not horribly so. It is powered by two AA batteries, so we recommend you consider Lithium Ion and rechargable batteries to get the most out of the camera. It also supports both Windows (98SE or better) and Mac OS (9.1 or better) computers via USB port connection.

Overall, given the sub-$1,000 price tag you'll find for this camera on the street, the PhotoSmart 935 is the best-value camera we've seen for quite some time.

— Darren Yates

PC USER TOP BUY

Canon PowerShot Digital IXUS II

RATING 8 Price: $899 Contact: Canon Phone: (02) 9805 2000 Web: www.canon.com.au ✔ Stainless steel construction ✔ 3.2 megapixels ✔ Clever autolighting

Canon's tiny second-generation IXUS digital camera improves its resolution from 2.1 to 3.2 megapixels for a maximum image size of 2,048 by 1,536 pixels. It has a fully retractable 2X optical zoom and stores images on standard SecureDigital (SD) memory cards, with a 16M card supplied with the kit. Despite its size, there's still room for a 1.5in colour LCD on the rear, plus a built-in flash with red-eye reduction.

The camera is too small to use conventional batteries, so Canon supplies a special Lithium Ion rechargable unit that can be removed from the camera. Typical of most digital cameras, the LCD chews through batteries, dropping its life from 480 to 180 shots. The camera can also capture video movies at up to VGA (640 by 480-pixel) resolution, but only at 15 frames per second and only up to a maximum of 30 seconds per recording. The 16M card can only hold 13 seconds of Motion-JPEG (AVI) video at this resolution.

The most significant problems still faced by digital cameras that you don't often read about is the shutter delay — it can take as much as a second for some digital cameras to take the image after you've pressed the shutter release button. The IXUS II takes about 400 milliseconds, taken from the fact that it can capture up to 2.2 high-resolution images per second, provided the LCD is switched off.

There's a mini USB connection and a video-out port to view your images directly on your TV in PAL or NTSC format. It also comes with supporting software for both Windows and Mac OS computers. It weighs about 200g, so it feels just a little heavy in your pocket. It also comes with a battery charger and USB cable.

Fine camera, well worth a look: Canon PowerShot Digital IXUS II

The IXUS II handles shadowed objects with ease, but when tested against the Sydney Town Hall clock as part of Sydney's city skyline, it just slightly overexposed bright objects to compensate. Focusing is automatic but split into two regions — normal is from 47cm to infinity, while the macro mode can focus down to 10cm.

All up, the IXUS II is a fine camera for the price and well worth a look.

— Darren Yates >>>

A4TECH PETITE CORDLESS MOUSE

RATING 7 Price: $55 Contact: Anyware Computer Accessories Phone: (02) 9879 5788 Web: www.anyware.com.au ✔ Compact ✔ Small transceiver ✘ Nonrechargable batteries

The A4Tech Petite Cordless Mouse is a tiny optical cordless mouse, ideal for smaller hands or for use with a laptop. The mouse is symmetrical in shape, ideal for left and right-handed use. It uses two AAA alkaline batteries, which are provided. The mouse has the usual two buttons and scroll wheel, both of which work very well and have excellent feel. Pointer operation is fast and accurate. The transceiver is a thumb-sized USB unit. A PS/2-to-USB adaptor allows operation on either type of port. The transceiver can be plugged directly into a USB port, and a USB extension cable is provided to make it easy to place it in an ideal location.

— John Hepworth

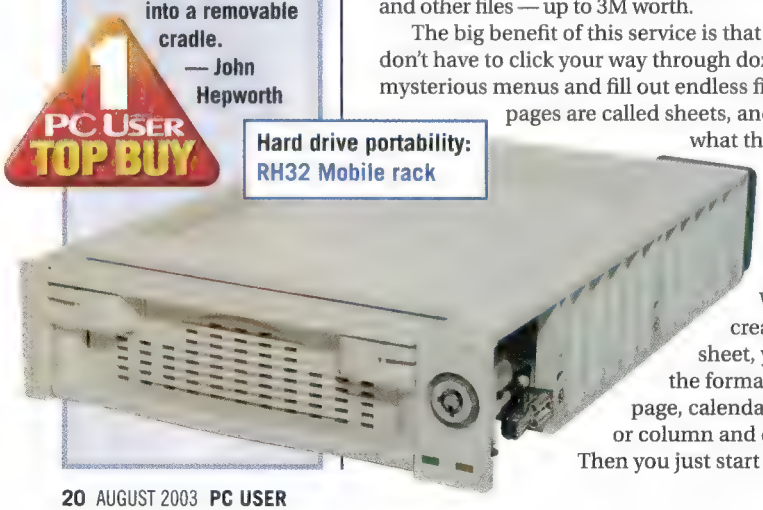
Tiny mouse with a good feel: A4Tech Petite Cordless Mouse

RH32 MOBILE RACK

RATING 9 Price: $79 Contact: Anyware Computer Accessories Phone: (02) 9879 5788 Web: www.anyware.com.au ✔ Serial to parallel ATA conversion ✔ Excellent drive cooling

This is an excellent rack with a removable hard drive cradle. Like all rack/cradle assemblies, it's a great way to take drives from one place to another, for backup or transfer of huge amounts of data. The RH-32 cradle is designed for ATA/133 drives with parallel ATA interfaces. The rack has a Serial ATA (SATA) interface to the computer, and chips for the serial to parallel conversion. Other racks in the range have other interface combinations. The extruded aluminium cradle is an excellent heatsink for the drive. The rack is fitted with a fan to blow cool air through the cradle. The key not only locks the cradle into the rack, but turns on drive power only when the cradle is locked. The RH-32 is an excellent way to mount an internal drive into a removable cradle.

— John Hepworth



Hard drive portability: RH32 Mobile rack

AOL|7 Broadband

RATING 8 Price: Monthly rate $64.95 for 256/64 kbps to $97.95 for 512/128Kbps Contact: AOL|7 Phone: 1800 265 777 Web: www.aol7.com.au ✔ Local content ✔ 24-hour technical support ✘ Expensive

Following consumer research and a four-month market trial, AOL debuted its long-awaited broadband service in March. Working with the Channel 7 network, the service offers local multimedia news and entertainment content as part of its plan to be a significant player in the booming broadband market. It is available in metropolitan parts of capital cities. AOL|7 plans to increase availability of the service in coming months.

The broadband connection is provided through several partners: AAPT (ADSL circuits), Connect (Internet connectivity) and Agile (network management). It claims to be superior to the mainstream Telstra ADSL service, because it has end-to-end control over the service and is more reliable. We did not test its performance to confirm the merits on this occasion.

Its most attractive feature is the absence of its proprietary logon client, which required upgrading to support new-generation Web sites. AOL|7 Broadband can be accessed via the browser of your choice, including Internet Explorer, Netscape or even Opera.

It has a customised AOL|7 toolbar to link to the service works with Netscape or IE. Also useful is its separate dialup account available at $1 an hour, for

when you don't have access to your broadband connection. But its pricing is no breakthrough. The entry-level (Freedom) plan costs $64.95 a month for 700M of downloads at 256Kbps speed and 64Kbps upload. Freedom PLUS costs $79.95 for 1G download of data at 512Kbps speed and 128Kbps upload. Freedom MAX costs $97.95 a month and you get up to 3G of data at 512Kbps speed. If you opt for an 18-month contract, you save $170 on installation, and a 24-month contract gives you free installation and a modem.

Some content is free of these limits, including AOL|7 Online Help, My Account and Seven Lifestyle.

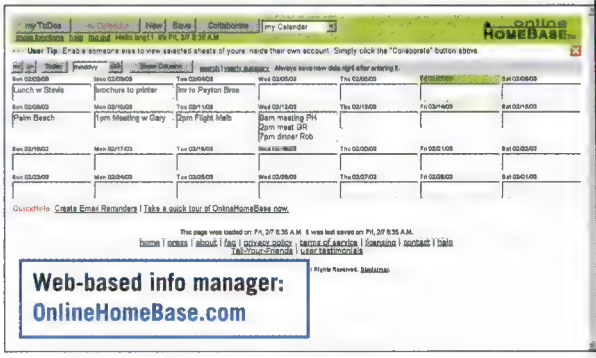
— John Hilvert

OnlineHomeBase.com

RATING 8 Price: Free Web: www.onlinehomebase.com ✔ Easy interface ✔ No advertising ✘ Mobile phone reminders US only.

If you've ever been away from home and realised that the information you need is on your home computer, OnlineHomeBase's free service can save you from such hassles. The service calls itself a 'Web-based free-form personal information manager', and you can store a calendar, documents, passwords, graphics, and other files — up to 3M worth.

The big benefit of this service is that you don't have to click your way through dozens of mysterious menus and fill out endless fields. Its pages are called sheets, and that's just what they are — blank Web pages with several icons along the top. When you create a new sheet, you decide the format: blank page, calendar, columns, or column and calendar. Then you just start typing,



paste in information you've found on the Web, or paste in data from your computer. You can even use a sheet as an online photo album — click the image icon on the formatting toolbar to upload images.

OnlineHomeBase can send you reminders; for example, if you enter **Lunch with Jenny ;; Tuesday at 1 pm**, it takes the ;; notation and emails you the phrase at the time you've specified.

Once you've got the information in your password-protected OnlineHomeBase account, you can access it from any computer anywhere, anytime. You can also share a sheet with other people by selecting the Share option, so that the page gets a unique address outside your protected account. A sheet on OnlineHomeBase can have 100,000 characters of text, or roughly 20,000 words, so you've got sufficient space to use it as an online portfolio or CV.

— Angela Booth

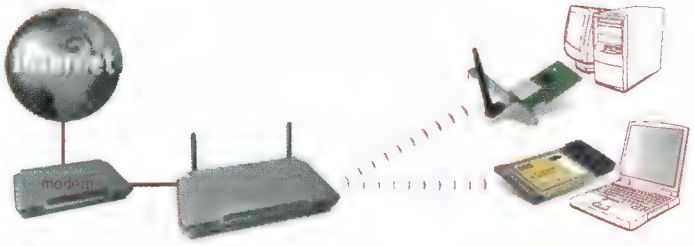
BELKIN

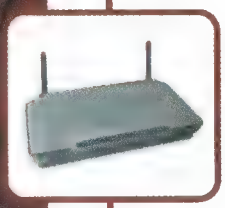
Wireless Networking Made Simple 54g

- Simultaneously share your cable/DSL Internet access with multiple computers
- Share files and other network peripherals (printers, scanners, DVD-ROMs, CD-ROMs)
- Works with 802.11b products and coffee shop/airport "hot spots"

And do it all using the fastest wireless technology available – 54Mbps!

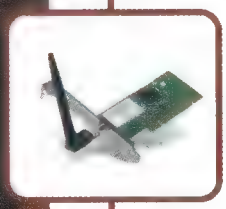
Virtually
5x
FASTER





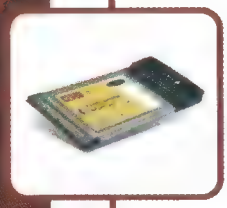
54g Wireless Cable/DSL Gateway Router-F5D7230au4

- Shares your high-speed Internet connection with all your computers
- Offers 6 months free of Parental Control: Web Content Filter to protect your children from objectionable web content
- Offers Easy Install Wizard to have your network set up in under 3 minutes
- Works with all 802.11b devices
- Connects wired computers with its built-in switch



54g Wireless Desktop Network Card-F5D7000au

- Connects your desktop equipped with an available PCI slot to a wireless network
- Works with all 802.11b devices
- Features 64- and 128-bit WEP encryption
- Works with Windows® 98 SE, 2000, Me, or XP



54g Wireless Notebook Network Card-F5D7010au

- Connects your notebook to a wireless network
- Works with all 802.11b devices
- Features 64- and 128-bit WEP encryption
- Works with Windows 98 SE, 2000, Me, or XP

54g Wireless Network Access Point-F5D7130au

- Allows you to add 54g wireless networking to an existing network
- Expands the coverage area of an existing wireless network
- Features 64- and 128-bit WEP encryption
- Works with all 802.11b devices

Questions about Networking?
Want to know your nearest stockist location?
1800-235-546 or visit www.belkin.com/anz

BELKIN
belkin.com

Belkin, Ltd.
+61 (0) 2 4372 8600
West Gosford • Australia

Belkin Components, Ltd.
+44 (0) 1933 35 2000
Rushden • United Kingdom

Belkin Corporation
310.898.1100
Compton • CA • USA

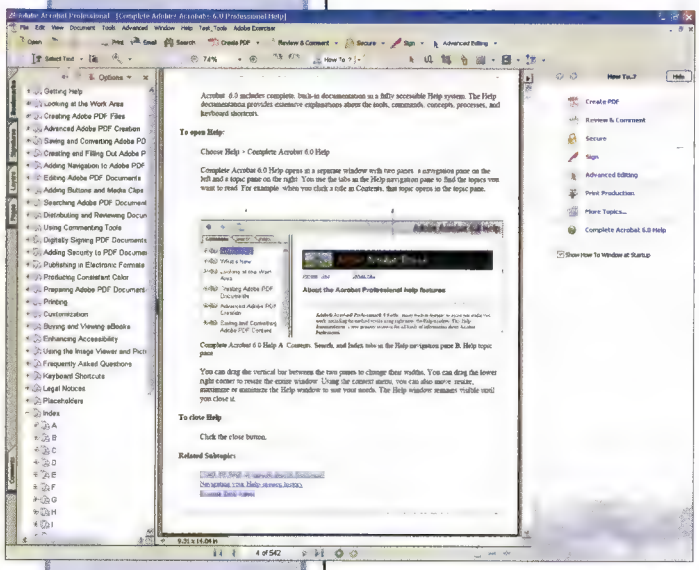
© 2003 Belkin Corporation. All rights reserved. All trade names are registered trademarks of respective manufacturers listed.

23AD005

Industry standard: Adobe Acrobat 6

Adobe Acrobat 6

RATING 9 **Price: Pro, $949; Standard, $599; Elements, $69 Contact: Adobe Phone: 1300 500 205 Web: www.pacific.adobe.com ✓ The industry standard ✓ Video and Flash ✗ Expensive**



Many of you will know Acrobat as the PDF file format that many documents are distributed as online or on CD. It allows content creators to provide documents with full layout, font and graphic features, looking just the way they want in a format that is universally accepted. To view Acrobat documents, all you need is the free Acrobat Reader (now renamed Adobe Reader). However, to create them, you need the Acrobat application. Version 6 has just been released and comes in three basic flavours: Elements, Standard and Professional.

Since its early days as a convenient file format for the Web, Acrobat has become widely accepted by the professional print community as a high-quality generic exchange format. You can create artwork for published magazines, posters, CD art, or any other professional work and simply supply it to your printer as a PDF file (or now the standard PDF/X format). PDFs can be output directly from within Microsoft Word, or any number of desktop publishing tools like PageMaker and InDesign, or you can import a ready-made file and have Acrobat convert it to PDF for you. It has also become a tool for network publishing and document editing, thanks to its review and archive features.

Elements is the entry-level version for anyone wanting to get into PDF document creation, and is ideal for Word users who want to output to PDF for the Web, for example. The Standard version is better suited to small business and enterprises that want to use PDF as a generic format for documents that require review, commenting and editing through several drafts. It is great for workgroups, book editors and the like.

You can also output from within any Microsoft Office application and Internet Explorer, with a single click. You can even combine several files of different types instantly into a single PDF.

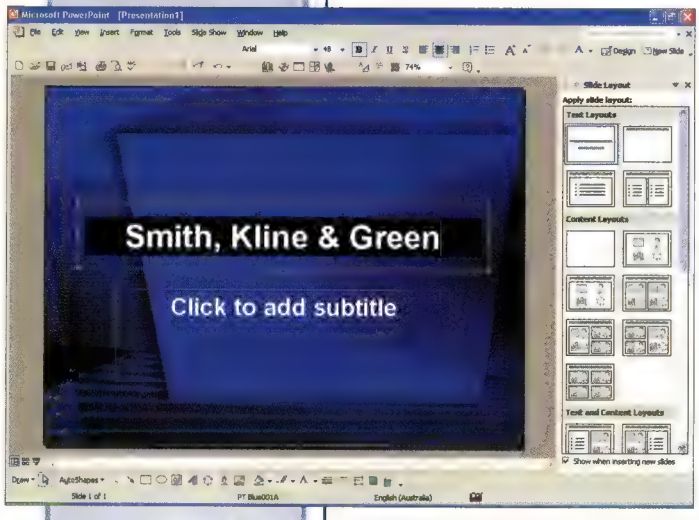
If you have been using Acrobat professionally, some of the new features in the Pro version will be most welcome. As well as those features already mentioned above, there is output support for programs like AutoCAD and Visio, as well as enhanced preflight tools when preparing documents for printers, with support for colour separations, set marks and bleeds. For more complex interactive documents, there is also support for electronic forms, and most interestingly of all, support for videoclips and Flash content. This makes Acrobat virtually a multimedia authoring tool if you want to use it that way.

Acrobat is one of those programs that is really quite mundane and boring, but vital for anyone serious about distributing electronic documents, or creating high-quality output for print. And this new version just makes it that much better.

— Philip Moore

New PowerPoint templates: PowerPlugs Ultimate Combo 10 Plus

PowerPlugs Ultimate Combo 10 Plus



RATING 7 **Price: $US629 Contact: ETools International Phone: (08) 8248 6463 Web: www.crystalgraphics.com ✓ Professional ✓ High-quality designs ✗ Poor organisation**

One PowerPoint presentation can look like a cookie-cutter copy of another, because everyone uses the same Microsoft templates. PowerPlugs, a Microsoft Office add-on, is your chance to break from the pack. This monster package of 10 CDs contains thousands of PowerPoint templates, with animations, transitions, two and three-dimensional charts, shapes, and special effects.

Once installed, you select your templates and effects from within PowerPoint. If you're new to PowerPoint and presentations, one CD is devoted to training, so you can ramp up your skills and learn professional shortcuts to great presentations. There's also a CD of artistic Microsoft Outlook stationery.

Although well-designed, this package needs more organisation to make it easier to find and use the templates. Some of the CDs were also difficult to install.

— Angela Booth PCU

SUPERBIT

BIGGER RANGE. BETTER PRICE.

NOT AVAILABLE IN REGION 1

DOLBY DIGITAL & DTS 5.1 AUDIO* DOUBLE BIT-RATE ENCODED VIDEO

- The evolution of DVD continues with four new titles added to our extensive existing range - all at a lower price!
- Each DVD ensures the ultimate viewing experience with Dolby Digital and DTS 5.1 audio as well as double bit rate encoded video.*
- For more information, log onto www.superbitondvd.com.

DOLBY DIGITAL

dts

BRING IT HOME. BRING IT ON.

DVD VIDEO

Top five PCs under $1,500

Darren Yates challenged PC makers to send in their best sub-$1,500 system.

This month, we decided to push PC makers a bit more by dropping our usual budget price for the top five from $1,700 to $1,500. Local vendors answered the challenge with some amazing systems and full marks also go to brand-name Acer for entering a good-value system in this tough category.

Yet, despite lowering the price point, many of the PCs here exceed the $1,700 systems in our PC supertest in the June edition. When the norm is now an 80G hard disk drive, CD-R/RW and DVD-ROM drives, nVidia GeForce4 Ti4200 graphics card and a 17in CRT monitor for $1,500, you can't help but be astounded at what your money now buys.

MISSING IN ACTION

We contacted 30 local and international vendors for this feature but several, including IBM and Hewlett-Packard, could not or would not supply systems. Without the ability to test and evaluate their systems, it's hard to recommend PCs from these brands.

OUR TOP FIVE PCs

Whether you want to buy a new PC now or later, *PC User* will be there to help you with our regular 'Top five PCs' section. Here's how it works. Each month, we invite vendors large and small to submit their best desktop PCs at a particular price point. The price points are rotated from month to month. For example, this month it's budget systems and next time around we'll test midrange PCs.

All PCs we receive undergo preliminary testing, and we use these results, as well as our judgement of each PC's features and price, in deciding the five PCs that offer the best overall value. We then put these five PCs through another barrage of tests, and again review what value they offer the buyer, in deciding the final top five. See 'How we tested' on page 26 for more details.

To participate, each vendor must sign a document guaranteeing that the system supplied to *PC User* (with the exact same specifications or better) is available at the stated price until the end of *PC User*'s onsale period (which is August 10 for this edition). And, of course, we can only test the systems, not the vendors' after-sales service.

PC eXpress Avatar 2600

Price: $1,480 **Contact:** PC eXpress **Phone:** (02) 9584 0567 **Web:** www.pc-express.com.au ✔ Best 3D games performance ✔ Excellent nForce2-based motherboard ✔ DVD-ROM and CD-RW drives

This system won our high-resolution 3D games test, but that's not the only reason we chose the Avatar 2600 as our number one PC. It was a very good performer across the board, with an impressive set of specifications, including an Athlon XP 2600+ processor, 512M of memory, an 80G hard disk drive, and a graphics card based on nVidia's ageing, but still great value, GeForce4 Ti4200 AGP8X chip.

I was most impressed to see ASUS's A7N8X motherboard, a high-quality board featuring nVidia's nForce2 chipset, which is my pick of Athlon boards at the moment. Like other systems in this top five, it set a high standard by also including both DVD-ROM and CD-RW drives, and a 17in CRT monitor, all for under $1,500.

In reality, there's not much more than a coat of paint between this and the i-Tech system in the second spot, with both using many similar components. The difference came down to the choice of hard disk drive — the PC eXpress Seagate drive is considerably faster than i-Tech's Western Digital drive, and that showed up on content-creation applications like Photoshop and Premiere.

All up, the PC eXpress Avatar 2600 is an amazing system for the money, ideal for office, high-end authoring applications or 3D games.

i-Tech AMD Award Series

Price: $1,499 **Contact:** i-Tech **Phone:** 1800 833 883 **Web:** www.i-tech.com.au ✔ Athlon XP 2800+ processor ✔ ASUS A7N8X motherboard ✔ CD-RW and DVD-ROM drives

I don't think we've ever had a top five where the choice between first and second spot has been as tough as it was this month. In most other features, this excellent i-Tech AMD Award Series system would have taken our Top Buy. I nearly fell over looking at the specs of this machine and the price tag — you couldn't buy a system this fast back in January for $2,700, let alone $1,499.

AMD is probably as surprised as I am to see its Athlon XP 2800+ processor here, but coupled with 512M of memory and ASUS's excellent A7N8X motherboard, it topped the Office XP tests by a comfortable margin. And there was next to no difference in the high-resolution 3D games performance between the top two systems. In fact, the only difference between these two systems is the processor and hard disk drives, and i-Tech's bet on a faster processor and slower drive almost paid off.

However, the content-creation performance was slightly below the PC eXpress system, which we put down to the slower drive. It was just (and I mean just) enough to push this i-Tech system into second place. This AMD Award Series is a great all-round system — and amazing value.

Marvel Computers Performer 2500XP

3 TOP FIVE PCs

Price: $1,499 Contact: Marvel Computers Phone: (02) 9680 9688 Web: www.marvelcomputers.com.au ✔ Fastest hard disk drive ✔ Good all-round performer ✔ CD-RW and DVD-ROM drives

Marvel Computers has been a regular top five place-getter since last year and has consistently put together good systems that offer great value. The Performer 2500XP is no different, and features AMD's new Athlon XP 2500+ processor, which has more level 2 cache than an XP 2600+, but a comparatively slow clock speed (see our Processor Report on page 28).

Combined with 512M of memory and a Ti4200-based graphics card, this system performed quite well on all tests, but it couldn't match the top two systems. That could be due to the lower-cost ECS L7S7A2 motherboard, which is based on a SiS chipset, rather than the nForce2, and lacks many of the features of the ASUS A7N8X board. I'm sure the slower clock speed of the XP 2500+ processor also played a part. However, Seagate's 80G Barracuda hard drive was outstanding, turning in the fastest hard drive data transfer speed at 12,400K per second.

It's no coincidence that the top three systems come supplied with BenQ's 17in G774 flat-screen CRT monitor — it's about the cheapest flat-screen on the market. The Performer 2500XP also features the same Lite-On optical drives as the i-Tech system.

All up, a good all-round system with everything you could wish for at the price.

Plus Corporation Astra V43

4 TOP FIVE PCs

Price: $1,499 Contact: Plus Corporation Phone: (02) 9630 3166 Web: www.pluscorp.biz ✔ AMD Athlon XP 2500+ chip ✔ FireWire ✔ GeForce FX 5200 graphics chip

Plus Corporation is another regular in our monthly top five and the Astra V43 is a very credible effort. It features an Athlon XP 2500+ processor and 512M of memory, and is built around Gigabyte's GA-7VAX1394 motherboard.

It's packed with features, including FireWire, but the board's VIA KT400 chipset has shown itself to be a bit of a slowpoke, turning in the slowest Office XP score of the top five. However, it's one of the first PCs to include Leadtek's new WinFast A340 graphics card, based on nVidia's GeForce FX 5200 graphics chip. It's actually slower than the GeForce4 Ti4200 chip, but the FX 5200 will support future DirectX 9-based games in all their graphic glory.

Plus Corporation covers all of the right bases with Samsung's CD-RW/DVD-ROM combo drive, Seagate's 80G Barracuda hard drive and Philip's 17in 107E CRT monitor.

Overall, I would prefer another motherboard, but it's still a nice system, worthy of a top five finish.

Adrenalin Computers

5 TOP FIVE PCs

Price: $1,499 Contact: Adrenalin Computers Phone: (08) 8410 0777 Web: www.adrenalin.net.au ✔ Fastest multimedia PC ✔ CD-RW/DVD-ROM combo drive ✔ 512M of memory

We saw our first PC from this South Australian vendor in our June PC supertest and we were impressed with the immaculate build quality of that high-end system. The same applies to this budget PC, with the inside of the system neat, tidy and well laid out.

AMD's Athlon XP 2500+ processor gets yet another run here, along with 512M of memory and EPoX's EP-8RDA+ motherboard. This is a new board we haven't seen before, but it produced the best content creation score of the roundup, cracking the 40 mark — great for an AMD-based system and incredible for under $1,500.

The Lite-On CD-RW/DVD combo drive and Mitsubishi's excellent 17in CRT monitor round out the package, but the compromise is a smaller 40G hard disk drive and ATI's Radeon 9000 Pro graphics chip, which produced the worst 3D games performance of the top five.

It might just do for the occasional gamer, but for everyone else, this is a fine system. However, I'd pay a little more for a bigger hard drive. >>>

TECH TERMS

AGP (advanced graphics port). An interface (or bus) on the motherboard that is dedicated to the graphics chip or card. Different versions of AGP support different bandwidth speeds: 1X (266Mps), 2X (533Mps), 4X (1.07Gps) and 8X (2.06Gps).

Chipset. A group of two chips on the motherboard that determines what processors and memory it can handle, and what the system can do, such as bus speeds to and from the graphics card and hard disk drive.

Colour depth (16 bit, 32 bit and so on). Refers to how many colours are available to be displayed at any given time, measured in binary bits. The most commonly used screen settings are 16 bit (65,536 colours) and 32 bit (16.7 million colours).

CRT (cathode ray tube). The most common technology used for PC monitors and televisions.

DDR (double data rate). A type of synchronous dynamic RAM (SDRAM) that is twice as fast as standard 100MHz or 133MHz SDRAM and has taken over as the dominant system memory format. The most common type of DDR is PC2100, which runs at 266MHz. PC2700 is the fastest type of DDR that is an approved standard, running at 333MHz.

TECH TERMS

DirectX 9. Microsoft's DirectX is a set of multimedia instructions that allows programmers to develop games independently of hardware makers, but still take advantage of the latest hardware features such as advanced new 3D effects in graphics cards. Most current games are based on version 8 of DirectX but a new wave of games built around DirectX 9 will be out in the coming months. That doesn't necessarily mean you won't be able to play them with an older graphics card, but they will look better with a new DirectX 9-capable card.

FireWire. Officially known as IEEE 1349, this is a fast interface for connecting devices such as digital video cameras to a PC.

L2 (Level 2) cache. A small amount of fast memory that the processor uses to store commonly used instructions.

Resolution. Indicates the number of dots used to make up a computer image. Measured in pixels, horizontally and vertically (for example, 640 by 480 pixels). The higher the resolution, the larger the image or the more information that's displayed on the computer screen.

HOW WE TESTED

We used a ranged of benchmarks to test real-world performance with business applications such as Microsoft Office XP, content-creation apps like Adobe Photoshop and Premiere, and 3D games, as well as testing hard disk drive performance. See page 28 for more details.

JUST MISSED THE CUT

TI Computers AMD Super Deluxe Pack

Price: $1,499 **Contact:** TI Computers
Phone: (02) 9437 5437 **Web:** www.ticomputers.com.au

With an Athlon XP 2600+ processor, 80G hard drive and Ti4200 graphics, this is quite a good all-round performer. However, with only 256M of memory and a CD-RW drive only (no DVD playback), it just missed the top five.

TECS AMD Diablo 2400

Price: $1,495 **Contact:** TECS **Phone:** (03) 9877 7071
Web: www.tecs.com.au

Another reasonable all-round performer, with an Athlon XP 2400+ chip, 512M of memory and Ti4200 graphics, but again, only a CD-RW drive is included.

ARC Computers ARC-Value

Price: $1,489 **Contact:** ARC Computers
Phone: (02) 9748 8322 **Web:** www.arcco.com.au

Good features with LG's CD-RW/DVD combo drive and an Athlon XP 2500+ chip. However, with only 256M of memory, a 40G hard drive and a slow Radeon 9200 graphics card, it couldn't match the value in the Top Five.

Acer AcerPower ST

Price: $1,499 **Contact:** Acer Computer Australia
Phone: 1300 366 567 **Web:** www.acer.com.au

This 2.4GHz Pentium 4 system performed well on content-creation applications, but it wasn't up to the task of 3D gaming. However, if you're looking for a cheap big-name brand for business use, this would be our pick. PCU

TOP FIVE SUB-$1,500 PCs: HOW THEY COMPARE

	PC eXpress Avatar 2600	i-Tech AMD Award Series Athlon XP 2800+	Marvel Computers Performer 2500XP	Plus Corporation Astra V43	Adrenalin Computers Athlon XP 2500+
SPECIFICATIONS					
Processor	AMD Athlon XP 2600+	AMD Athlon XP 2800+	AMD Athlon XP 2500+	AMD Athlon XP 2500+	AMD Athlon XP 2500+
Memory	512M DDR333	512M DDR333	512M DDR333	512M DDR333	512M DDR333
Motherboard	ASUS A7N8X	ASUS A7N8X	ECS L7S7A2	Gigabyte GA-7VAX1394	EPoX EP-8RDA+
Graphics card	VideoExcel 128M GeForce4 Ti4200 AGP8X TVout	Leadtek 128M WinFast GeForce4 Ti4200 AGP8X VIVO	Chaintech 128M GeForce4 Ti 4200 VIVO	Leadtek 128M WinFast A340 Ultra TVout	Gigabyte Maya Radeon 9000 Pro
Graphics chip	nVidia GeForce4 Ti4200 AGP8X	nVidia GeForce4 Ti4200 AGP8X	nVidia GeForce4 Ti4200 AGP8X	nVidia GeForce FX 5200	ATI Radeon 9000 Pro
Hard disk drive	80G Seagate Barracuda	80G Western Digital WD800JB	80G Seagate Barracuda ST380011A	80G Seagate Barracuda	40G Estern Digital WD400JB
Optical drive(s)	Samsung 16x DVD-ROM, Lite-On 52x24x52 CD-RW drives	Lite-On 16x DVD-ROM, Lite-On 48x24x48 CD-RW drives	Lite-On LTR-48246S 48x24x48 CD-RW, JLMS JX-HD165H 16x DVD-ROM drive	Samsung 52x25x52 CD-RW/16x DVD-ROM combo drive	Lite-On LTC-48161H CD-RW/DVD-ROM combo
Monitor	17in BenQ G774 flat CRT	17in BenQ G774 flat CRT	17in BenQ G774 Flat CRT	17in Philips 107E Black CRT	17in Mitsubishi DiamondView 1770H CRT
Operating system	Windows XP Home Edition	Windows XP Home Edition	Windows XP Home Edition	Windows XP Home Edition	Windows XP Home Edition
TEST RESULTS					
Business Winstone 2002	34.9	36.4	31.3	29.5	31.6
Multimedia Content Creation Winstone 2003	39.2	38.4	33	31	40.4
Business Disk WinMark 99	11,100	8,530	12,400	5,130	5,550
Quake III (640 by 480 pixels, 16 bit)	266	275.1	211	215.4	247.4
Quake III (1,280 by 1,024 pixels, 32 bit)	180.2	180.1	165.9	120.3	108

At your side.

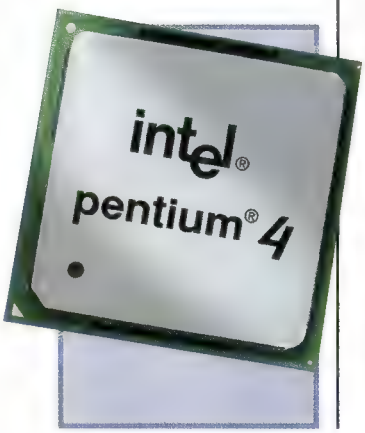
brother®

corporate printing solutions www.brother.com.au

For more information please contact: NSW/ACT: (02) 9887 4344 VIC: (03) 9890 4844 QLD/NT: (07) 3348 9268 SA/TAS: (08) 8272 1300 WA: (08) 9478 1788

P4 hits 3.2GHz

Darren Yates tests Intel's new top-end desktop processor, plus AMD's latest budget chip.



This month's Processor Report could be mistaken as a look at the PC microprocessor industry as a whole. While Intel continues pushing its Pentium 4 processor to a new high of 3.2GHz, minnow AMD is shoring up its position at the budget end of the market with the new Athlon 2500+.

3.2GHz Pentium 4

The 3.2GHz chip continues Intel's move along an 800/200MHz frontside bus path (a 200MHz clock speed bus with data quad-clocked through at 800MHz). The chip is built using Intel's 0.13-micron process and features 512K of level 2 cache memory onboard.

Our Abit IC7-G test motherboard didn't recognize the chip first up. Thankfully, this i875P-chipset board has excellent chip setup features and we were able to dial up the correct 16:1 CPU-to-bus ratio and all was well.

While Intel seems to be able to regularly increase the Pentium 4's clock speed, the 3.2GHz chip was a little disappointing in our tests. In comparison with the 3GHz Pentium 4, content-creation applications like Photoshop and Premiere were 2.5% faster, but there was no improvement at all in Microsoft Office XP or high-resolution 3D games performance.

However, as our tests in last month's edition showed, the Pentium 4 still leads the Athlon XP in every way apart from Office XP performance, which Intel doesn't seem to think is important. AMD's Athlon 3200+ was clearly outstripped by the 3GHz Pentium 4 with two of the main types of applications that really test out a processor: 3D games and content-creation applications.

AMD's Athlon XP 2500+

More interesting this month was the soft launch of AMD's Athlon XP 2500+ processor, which has quietly but quickly found its way into a lot of budget PCs (see our Top 5 PCs on page 24).

The XP 2500+ fills one gap AMD skipped on its way up the processor ladder the first time around — it's basically the Athlon Barton core with a 166/333MHz frontside bus and 512K of level 2 cache memory onboard.

The XP 2400+ and XP 2600+ chips on either side of it only have 256K of level 2 cache memory, but all three have the 166/333MHz frontside bus. What's interesting here is that the 1.83GHz clock speed of the Athlon XP 2500+ is more comparable to the 1.8GHz clock speed of the XP 2200+, but the XP 2200+ only features 256K of level 2 cache.

The question is now whether or not AMD is capable of or willing to increase the clock speed of the XP chip any further. The three features that affect performance are clock speed, level 2 cache and frontside bus speed, but since the XP 2800+, AMD has only really changed the level 2 cache or FSB.

The first Athlon XP chip to cross the 2GHz line was the XP 2400+. Since then, the XP 2800+ hit 2.16GHz, the XP 3000+ also 2.16GHz and the XP 3200+ hit 2.25GHz, but on the back of an FSB increase from 166/333 to 200/400MHz.

However, our test results show what a difference level 2 cache makes. The XP 2500+ was over 7% faster than the 2200+ with Office XP applications and 8% and faster with high-resolution 3D games. In fact, its Office XP performance was on a par with the 3.0GHz Pentium 4. Naturally, the P4 is streets ahead with content-creation applications and 3D games, but for a processor costing about $180 — less than a quarter of the price of the 3GHz chip — the XP 2500+ is pretty darn good. PC U

PROCESSORS: HOW THEY COMPARE

	3.2GHz Intel Pentium 4C	3GHz Intel Pentium 4	AMD Athlon XP 2500+	AMD Athlon XP 2200+
SPECIFICATIONS				
Clock speed	3200MHz	3000MHz	1833MHz	1800MHz
FSB speed	800/200MHz	800/200MHz	333/166MHz	333/166MHz
Level 1 cache memory	20K	20K	128K	128K
Level 2 cache memory	512K	512K	512K	256K
TEST SETTINGS				
Operating system	Windows XP Pro	Windows XP Pro	Windows XP Pro	Windows XP Pro
Motherboard make and model	Abit IC7-G	Abit IC7-G	Asus AN78X Deluxe	Asus AN78X Deluxe
Motherboard chipset	Intel i875P	Intel i875P	NVIDIA nForce2	NVIDIA nForce2
Graphics chip	nVidia GeForceFX 5800 Ultra	nVidia GeForceFX 5800 Ultra	ATI Radeon 9800 Pro	ATI Radeon 9800 Pro
TEST RESULTS*				
Business Winstone 2002	31.9	31.8	31.5	29.3
Multimedia Content Creation Winstone 2003	47.2	45.9	32.6	N/A
Quake III (640 by 480 pixels, 16 bit)	382.5	371.7	282.3	256.4
Quake III (1,280 by 1,024 pixels, 32 bit)	316.4	318.2	258.6	243.3
Unreal Tournament 2003 average (1,280 by 1,024 pixels)	166.3	164.2	151.7	139.8
Unreal Tournament 2003 low (1,280 by 1,024 pixels)	58.3	76.4	47.4	45.5

* See 'How we tested' on page 30

FX 5900 vs 9800 Pro

Darren Yates

pits nVidia's new GeForce FX up against ATI's Radeon 9800 Pro.

Graphics chip vendor nVidia may well have lampooned its 'ugly duckling' GeForce FX 5800 Ultra graphics chip at the recent E3 show in Los Angeles, but in a surprise twist, it outperforms both the ATI Radeon 9800 Pro and the new FX 5900. We also tested the new 256M Albatron Gigi FX5600EQ card and found extra memory doesn't always add much in the way of extra performance.

MSI FX5900-TD128

RATING 6 **Price: TBA Contact: MSI Computer Australia Phone: (02) 9748 0070 Web: www.msi.com.tw ✓ Better design ✓ Faster than 9800 Pro ✗ Slower than FX 5800 Ultra**

Based on nVidia's brand-new GeForce FX 5900 chip, we got this card hot off MSI's production line. The card uses two fans — one on each side of the board — along with a large heatsink that also encompasses the memory chips, so it takes up two expansion slots. It also requires a four-pin molex power connector from your PC's power supply (a power splitter cable is supplied).

The card is quiet and doesn't run anywhere near as hot as the FX 5800 Ultra. The only trouble is the FX 5900 is slower. Admittedly, it's not the higher-bandwidth Ultra version of the FX 5900, but we were expecting more from a brand-new high-end chip.

At lower screen resolutions, it kept up with the FX 5800 Ultra on both Quake III and Unreal Tournament 2003, but it lagged behind the older chip at high resolutions. It outperformed the Radeon 9800 Pro in most of our tests. Its lowest frame rate in our high-resolution Unreal Tournament 2003 test was almost as strong as the 5800 Ultra's.

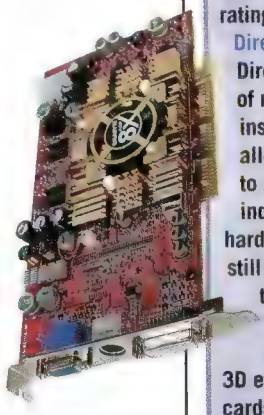
The card has 128M of memory, with standard VGA, DVI and S-Video ports, but no analog video capture (VIVO). All up, a fast card, but it's not earth-shattering.

Gigabyte Radeon 9800 Pro-TV out

RATING 7 **Price: $799 Contact: Rectron Phone: (02) 9748 7725 Web: www.gigabyte.com.tw ✓ Single-slot design ✓ Solid performer ✗ Not cheap**

Like other cards based on ATI's Radeon 9800 Pro chip, this one has a key advantage over the high-end GeForce FX cards: its single-slot design. nVidia may be crowing about the improved design of the FX 5900, but the fact is ATI can produce close to the same performance with a neat, single-slot card.

The Radeon 9800 Pro doesn't reach the same heights as the FX 5800 or 5900 cards, but it holds its frame rate well as you increase screen resolution, indicating that the 9800 Pro is also well placed to keep up with future games.



Like the MSI FX5900-TD128, this Gigabyte card features VGA, DVI and S-Video TV-out ports. But again, at this price, it's not especially good value.

I'd be waiting for DirectX 9-based games to appear in the coming >>

GRAPHICS CARDS: HOW THEY COMPARE

	MSI FX5900-TD128	Gigabyte Radeon 9800 Pro-TV out	Leadtek WinFast A300 Ultra	Albatron Gigi FX5600EQ
Graphics chip	nVidia GeForce FX 5900	ATI Radeon 9800 Pro	nVidia GeForce FX 5800 Ultra	nVidia GeForce FX 5600
Memory	128M DDR	128M DDR	128M DDR	256M DDR
AGP speed	AGP8X	AGP8X	AGP8X	AGP8X
Driver verson	44.03	6.14.1.6307	44.03	44.03
TEST RESULTS*				
Quake III (640 by 480 pixels, 16 bit)	390.1	358.6	392.5	383.7
Quake III (1,024 by 768 pixels, 32 bit)	366.5	351.6	371.4	239.5
Quake III (1,280 by 1,024 pixels, 32 bit)	308.9	311.3	318.8	151
Unreal Tournament 2003 average (640 by 480 pixels)	190.2	200.8	190.5	181.6
Unreal Tournament 2003 average (1,280 by 1,024 pixels)	163.7	162.7	169	67.8
Unreal Tournament 2003 low (1,280 by 1,024 pixels)	78	72.7	79.9	35.7

* See 'How we tested' on page 30.

TECH TERMS

BIOS (Basic Input/Output System). Built-in software that enables the processor to perform basic operations without having to access programs from a disk.

Chipset. A group of two chips that determine what processors and memory the motherboard can handle, and what it can do, such as what AGP speed and ATA rating it supports.

DirectX 9. Microsoft's DirectX is a set of multimedia instructions that allows programmers to develop games independently of hardware makers, but still take advantage of the latest hardware features, such as advanced new 3D effects in graphics cards. Most current games are based on DirectX 8 but a wave of games built around DirectX 9 will be out in the coming months. That doesn't mean you won't be able to play them with an older graphics card, but they will look better with a new DirectX 9-capable card.

FSB (Frontside Bus). The data conduit between the processor and main memory. This has a direct correlation with the type and speed of memory that can be used on the motherboard.

TECH TERMS

Hyper-Threading. A new Intel technology found in the 3GHz Pentium 4 and faster processors that allows them to process two application tasks at once, similar to multiprocessor systems.

Level 2 cache. A small amount of fast memory that the processor uses to store commonly used instructions.

Micro-ATX. The small version of ATX, the standard shape and format of today's motherboards.

Darren Yates

tests new boards based on Intel's 865PE chipset, plus a cool new compact nForce2 board.

«<<

months before buying any of these high-end cards. By that stage, their pricing should be a little more reasonable. If you really must buy one now, I'd be going for a Radeon 9700 Pro-based card, which is almost as fast a 9800 Pro, also supports DirectX 9 and can be picked up for under $700.

Albatron Gigi FX5600EQ

RATING 6 **Price: TBA Contact: Australia IT Phone: (03) 9543 5855 Web: www.albatron.com.tw ✓ Reasonable performer ✗ Extra memory makes little difference**

The GeForce FX 5600 chip is taking over from the Ti4200 as nVidia's mass market, midrange chip. It's not a huge step forward, but with 5600 cards priced generally at about $350, they're pretty good value. But the reason behind Albatron's decision to mate the chip with 256M of memory eludes us.

We suspected adding an extra 128M of memory to a low-cost chip would achieve only one thing: a higher price. Well, Alabtron was still to provide a retail price for this card as we went to press, but we do know that the extra memory makes little or no difference to the card's performance. Its test results weren't a lot better than a $250 Ti4200 card.

You may find 256M of memory will help top up the visual quality of complex games at higher resolutions and the 5600 chip will also display future DirectX 9 games in full glory. But the card's lowest frame rate of 36fps during our Unreal Tournament 2003 torture test hardly inspires confidence in the card's ability to handle graphically advanced future games.

New budget boards

Albatron KM18G Pro

RATING 8 **Price: $214.50 Contact: Australia IT Phone: (03) 9543 5855 Web: www.albatron.com.tw ✓ TV-out onboard ✓ nForce2 chipset ✗ 333MHz max. FSB**

Albatron has turned out its first AMD-based board with nVidia's nForce2 chipset — the first Micro-ATX board we've seen based on this chipset.

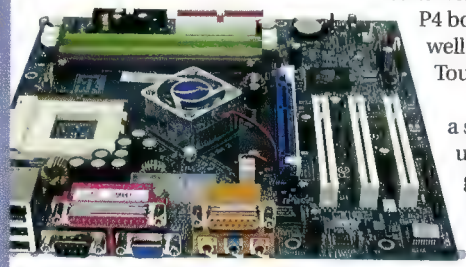
The board has one glaring issue: it oddly doesn't support a 400MHz frontside bus, so it can't be used with the latest Athlon XP 3200+ chip. However, Albatron has done well to squeeze what it has into this compact board.

The most unusual feature is the S-Video output integrated onto the board. It also has built-in six-channel analog sound plus digital audio in and out. There's no RAID and no Serial ATA, but you still get an AGP8X slot, plus three PCI expansion slots. The six USB 2.0 ports should handle nearly all peripherals, with the only thing missing being FireWire.

As with most AMD systems, coupling an XP 3000+ with 512M of DDR400 memory and Leadtek's WinFast A300 Ultra graphics card netted us an impressive Office XP performance — the highest we've seen from an Intel-based board and chip.

However, the same can't be said for content creation applications, where it lags behind a typical 3GHz Pentium 4 system by about 20%. Its 3D games results were also generally behind the P4 boards, but it held up pretty well in our high-resolution Unreal Tournament 2003 torture tests.

All up, the KM18G Pro isn't a serious option for long-term upgraders, but it would be a good board for a compact entertainment system.



Intel 865PERL

RATING 7 **Price: TBA Contact: Intel Australia Phone: (02) 9937 5800 Web: www.intel.com.au ✓ 865PE chipset ✓ Serial ATA RAID ✗ Poor BIOS upgrade system**

This enginerring sample 865PE board came with a big note telling us to upgrade the BIOS before we do anything. Of Intel's two available online options, neither would work with this board.

Forced into using the existing BIOS, the board would only register our Intel-supplied KingMax DDR400 memory modules at DDR333 speed. We've

HOW WE TESTED

Unless otherwise indicated in the tables, the components were tested with a 3GHz Pentium 4, MSI 865PE Neo2 motherboard, 512M DDR400 memory, 40G IBM DeskStar 7,200rpm ATA/100 hard disk drive and Windows XP Professional.

In all cases, the higher the scores, the better the performance. Here's a guide to the benchmarks used.

VeriTest's Business Winstone 2002. Tests real-world business application performance using Microsoft Office XP, Lotus Notes and other applications.

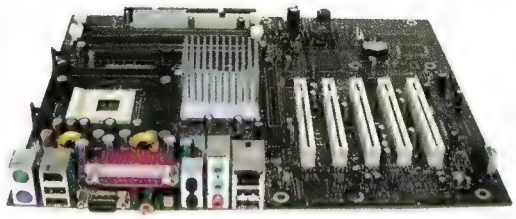
VeriTest's Multimedia Content Creation Winstone 2003. Tests real-world performance with Adobe Photoshop 7.0, Adobe Premiere 6.0, Macromedia Director 8.5.1, Macromedia Dreamweaver 4 and other high-end authoring applications.

Quake III demo001. Ever-popular game that tests real-world performance with older 3D games that use OpenGL instructions, measuring the average frame rate in frames per second (fps).

[H]ard|OCP's Unreal Tournament 2003 tests. A new game that tests how the cards handle the latest 3D games that use DirectX instructions. We supplemented the game demo with [H]ard|OCP UT2K3 Benchmark Utility (available from www.hardocp.com). This utility uses three game maps to really give systems a 3D torture test. Two results are provided: average frame rates for all three maps and lowest frame rate produced.

VeriTest's Disk WinMark 99. Synthetic benchmark that tests hard disk performance.

Note that these tests were performed without independent verification by VeriTest and VeriTest makes no warranties as to the results.



since read online that the 865PE is touchy about which DDR400 modules you use.

That said, the 865PERL's performance wasn't bad at all, despite the slower memory setting. It almost matched MSI's Neo2 board on both Office XP and content creation applications. It was outperformed by the Neo2 on 3D games, but the 865PERL still outclassed Albatron's Athlon-based board.

The board is loaded with features including Serial ATA RAID, and audio capabilities are excellent with S/PDIF (digital audio) output via coaxial (RCA) and optical (TOSLink) sockets on the back panel plate. It also features full six-channel analog audio sockets — no more BIOS swapping between in and out.

The most unusual feature is the back panel IEEE 1394a (400Mbps) port. Intel told us last year that it saw no reason to include FireWire — it's obviously seen things differently since then.

We hope our BIOS glitches are only issues with the engineering samples we received, because once fixed, the 865PERL looks to be an excellent option for those looking for top performance without paying top dollar.

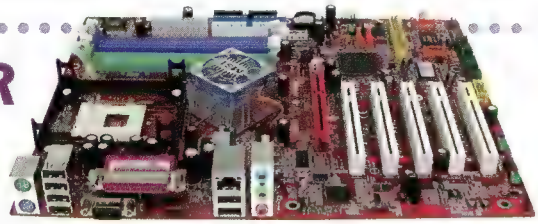
TECH TERMS

RAID (Redundant Array of Independent Disks). A group of technologies that use two more disk drives in combination to improve performance or add disk redundancy.

S/PDIF (Sony/Philips Digital Interface). A connection that allows audio to be transferred digitally without analog conversion, eliminating any degradation in signal quality.

See page 25 (Top Five PCs) for more tech terms.

MSI 865PE Neo2-FIS2R



RATING 8 **Price:** $349 **Contact:** MSI Computer Australia
Phone: (02) 9748 0070 **Web:** www.msi.com.tw
✓ 800MHz FSB support ✓ AGP8X ✓ SATA RAID

It's getting to the point where you have to wonder how much longer PCI slots will exist when you see a board like the 865PE Neo2-FIS2R. With its 865PE chipset, it supports the new C class Pentium 4 processors with their 800MHz FSB speeds — or it will handle any Northwood Pentium 4 or Celeron chip with up to 4G of DDR400 memory.

However, it's the raft of peripheral features that really impresses. These include an AGP8X slot for the latest graphics cards, Gigabit Ethernet onboard for high-speed data network transfer, plus eight USB 2.0 and three FireWire ports to ensure you have enough connection points for all of your external devices.

It also has integrated 5.1 analog audio plus digital audio out via an RCA socket using S/PDIF. You get standard IDE and Serial ATA drive access and RAID for both, thanks to Promise Technology's 20378 RAID chip.

Compared to ABIT's IC7-G with its 875P chipset, the Neo2 holds up very well in the performance stakes. And that's the thing to note with the 865PE chipset — despite some possible issues with DDR400 memory, overall application performance is only marginally behind the significantly more expensive 875P option.

And with motherboard vendors ready to add in anything Intel leaves out, you're not likely to miss out on much at all with an 865PE board. PCU

WHAT'S WITH ALL THE CHIPSETS?

Intel's release of its latest Springdale and Canterwood chipsets greatly increases the motherboard choice for consumers, but also the confusion. Here's how to tell the different chipsets apart.

Canterwood (i875P). This is Intel's top-drawer chipset, offering the best performance you can get from its Pentium 4 C class processors. It supports 200/800MHz and 133/533MHz frontside bus speeds, AGP8X and has no integrated graphics. Performance Acceleration Technology (PAT) separates this from the 865PE.

Springdale (865PE). The performance board for those on a lower budget. It supports 200/800, 133/533 and 100/400MHz FSB speeds, has an AGP8X slot, no integrated graphics, but has Serial ATA drive access and is RAID ready.

Springdale (865G). Performance board with Intel Extreme Graphics 2 integrated. It also has an AGP8X slot. It supports memory up to DDR400 (PC3200) and runs FSB speeds up to 200/800MHz.

Springdale (865P). Does not support 200/800MHz FSB speeds. At present, the top processor this board supports is the 3.06GHz Pentium 4 chip. As a result, it supports a maximum of DDR333 (PC2700) memory only. It still offers AGP8X, Hyper-Threading and most features of the other chipsets.

For a full chipset comparison, head to www.intel.com/design/chipsets/linecard.htm?iid=ipp_browse+chpsts_compare&.

MOTHERBOARDS: HOW THEY COMPARE

Board	Albatron KM18G Pro	Intel 865PERL	MSI 865PE Neo2-FIS2R
Chipset	nVidia nForce2	Intel i865PE	Intel i865PE
Max. memory capacity, speed	3G DDR400	4G DDR400	4G DDR400
Max. FSB supported	166/333MHz	200/800MHz	200/800MHz
Chip supported	AMD Duron, Athlon XP	Intel Pentium 4, Celeron (Northwood or better)	Intel Pentium 4, Celeron (Northwood or better)
TEST SETTINGS			
Processor	AMD Athlon XP 3000+	3GHz Intel Pentium 4	3GHz Intel Pentium 4
Memory	512M DDR400	512M DDR333	512M DDR400
Graphics card	Leadtek WinFast A300 Ultra	Leadtek WinFast A300 Ultra	Leadtek WinFast A300 Ultra
TEST RESULTS*			
Business Winstone 2002	35.7	31.6	31.3
Multimedia Content Creation Winstone 2003	37.7	45	45.2
Quake III (640 by 480 pixels, 16 bit)	334.7	380.2	394
Quake III (1,280 by 1,024 pixels, 32 bit)	290	311.9	317.5
Unreal Tournament 2003 average (1,280 by 1,024 pixels)	169.2	160	168.8
Unreal Tournament 2003 low (1,280 by 1,024 pixels)	52	67.2	67.7

* See 'How we tested' on page 30.

The perfect-value PC

Looking for the best-value configuration for a PC? Here are our Top Buy PC components and other products.

motherboard

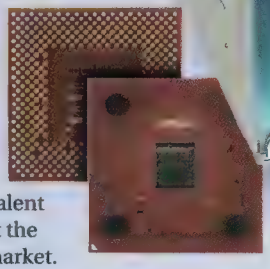
ASUS A7N8X Deluxe

Based on nVidia's nForce2 chipset, this is the fastest board we've tested for AMD's Athlon XP platform. It comes with tons of features, including DDR333 memory, AGP8X support and integrated 5.1 audio.

Reviewed: February 2003
Price: $329 **Contact:** Achieva
Phone: (02) 9742 3288
Web: www.asus.com.tw

processor

AMD Athlon XP 2500+



The Athlon XP continues to outperform equivalent Intel processors at the value end of the market. The 2500+ is a new chip with a faster frontside bus and extra level 2 cache than the 2400+.

Reviewed: August 2003 **Price:** About $180
Contact: AMD **Phone:** (02) 8877 7222
Web: www.amd.com

hard disk drive

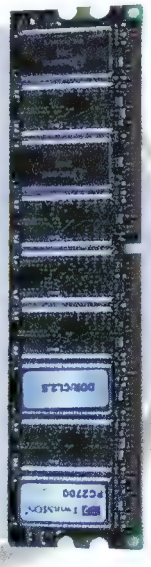
Hitachi 120GXP Deskstar 80G

If you're looking for value for money, this 7,200rpm ATA/100 hard drive is fast, with plenty of capacity.

Reviewed: March 2003
Price: $200 **Contact:** Hitachi
Phone: 1800 032 689
Web: www.hgst.com

memory

512M of PC2700 DDR



You could settle for 256M of RAM, but if you're running Windows XP or 2000, you'll get much more life out of your system with 512M. DDR333 (PC2700) memory offers the best value, but make sure it works with your motherboard.

Price: About $120

cd-r/rw drive

Lite-On LTC-48161H

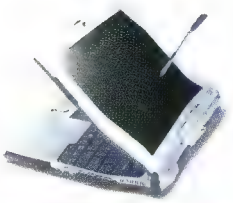
This internal CD-R/RW/DVD combo drive offers fast, flexible optical storage at a great price.

Reviewed: August 2003 **Price:** $139
Contact: Synnex **Phone:** 1300 880 038
Web: www.liteonit.com

I'm forever rewriting my own scrawl from meetings.

intel inside
centrino™
MOBILE TECHNOLOGY

You don't have time to rewrite your own rushed notes. So meet the first convertible tablet PC to feature Intel® Centrino™ mobile technology. With a simple 180 degree twist, Acer's TravelMate C110TCi transforms from notebook into slate, so you can write straight onto its 10.4" colour screen and it will convert your handwriting into text. Dictate to your TravelMate and it will interpret your voice. And, weighing a mere 1.4kg, you can write on, type in and talk to the C110TCi anywhere - from busy trains to bumpy cabs. With advanced wireless functionality, you can also share data with colleagues while on the go. The TravelMate C110TCi has power for up to 6 hours* use and comes with Acer's 2 hour service warranty**. Get your Acer convertible tablet PC today. Your writer's cramp will thank you.



ONLY 1.4kg

$3,999 RRP inc GST

Acer

www.acer.com.au

1300 366 567

Authorised Dealers

Acer recommends Microsoft® Windows® XP Professional for Mobile Computing.

Intel, the Intel Inside Logo and Intel Centrino are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. ©2003 Acer, Inc. All rights reserved. Acer and the Acer logo are registered trademarks and TravelMate is a trademark of Acer Inc. Product prices and specifications are subject to change without prior notice.

*Depending on configuration and usage.

W5Group ACE223/PCU

acer
Empowering People

HOW WE CHOSE THE COMPONENTS

We've been asked many times: 'What specifications should I look for in a PC?' Well, here are our recommendations. Rather than choose the best performing components, we've selected the best value, based on price, features and performance. We've also chosen components that will work together; for example, ensuring that the motherboard will work with our Top Buy processor and memory. The end result is the 'perfect value' system for most users. It may not be perfect for everyone, but our aim is to put together a system that would probably cost about $2,000 — possibly more or less, depending on the brand. However, we've also added some 'high-performance options' for those who want better features, such as superior 3D games performance. Follow this guide and buy from a good, reputable PC maker, and you'll end up with a very fast PC that's suitable for just about any task.

OTHER TOP BUYS

notebook

Dell Inspiron 500m

This notebook offers an excellent combination of features, performance and price, starting with Intel's Centrino platform, with its 1.5GHz Pentium-M processor. The ideal notebook when you need your computing portable, fast and cheap.

Reviewed: July 2003 Price: $2,999
Contact: Dell Computer Phone: 1300 303 192
Web: www.dell.com.au

tft monitor

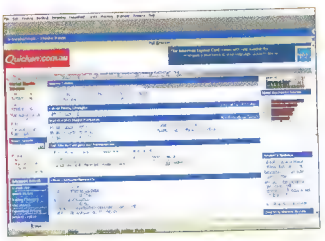
Cornea MP704

This is the cheapest 17in TFT monitor we've seen. With a native resolution of 1,280 by 1,024 pixels, the screen is bright, clear and sharp, with a good peripheral viewing angle.

Reviewed: June 2003 Price: $799 Contact: PCAdvantage
Phone: 1300 136 353 Web: www.pcadvantage.com.au

personal finance

Quicken Personal 2002 SE



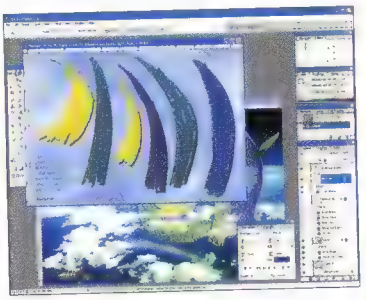
This software package has tools to help you balance your finances and provide account summaries.

Reviewed: July 2003 Price: $79.95 Contact: Quicken
Phone: 1300 784 253 Web www.quicken.com.au

image editing

Adobe Photoshop 7

For professional-quality print imaging, you can't go past the industry leader. Bundled with ImageReady for Web graphics, all your imaging needs are covered in one software package.



Reviewed: July 2003 Price: $1,503
Contact: Adobe Phone: 1300 550 205 Web: www.pacific.adobe.com

PCU

soundcard

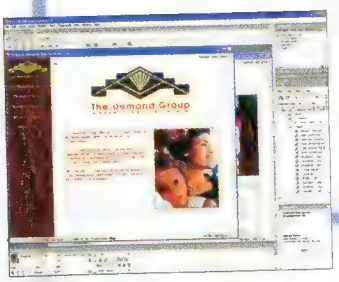
Creative Sound Blaster Extigy

The Extigy is an external box that has built-in Dolby Digital processing. Unbeatable sound quality at the price.

Reviewed: December 2002
Price: $399 Contact: Creative Labs Phone: (02) 9666 6100
Web: www.australia.creative.com

web authoring

Macromedia Dreamweaver MX



This is a powerful visual design tool for serious Web developers. It allows you to build and manage a Web site, as well as easily integrate scripts, audio and video.

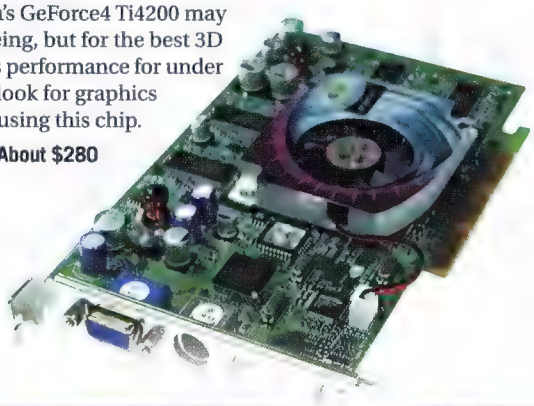
Reviewed: July 2003 Price: $869
Contact: FirmwareDesign Phone: 1300 369 951 Web: www.macromedia.com/ap/

graphics card

GeForce4 Ti4200 AGP8X

nVidia's GeForce4 Ti4200 may be ageing, but for the best 3D games performance for under $300, look for graphics cards using this chip.

Price: About $280

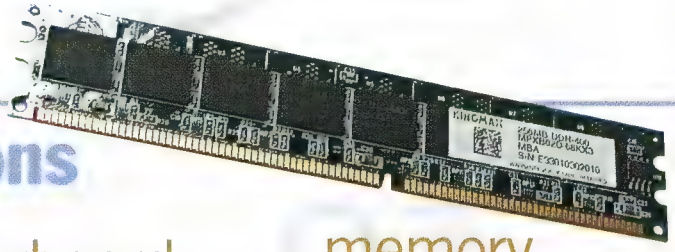


monitor

NEC V930

Why make do with a smaller monitor when you can have a great 19in CRT monitor for under $500! NEC's V930 offers the best combination of image quality, refresh rates, features and value that we've seen in a monitor.

Reviewed: February 2003 **Price:** $440
Contact: NEC **Phone:** 13 16 32
Web: www.nec.com.au



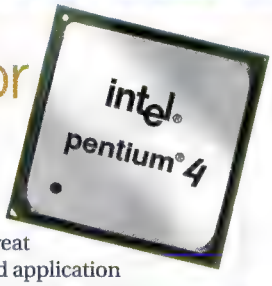
High-performance options

processor

Intel 2.8GHz Pentium 4-C

This processor offers great 3D games and high-end application performance, but get the C class version with an 800MHz frontside bus for best results with Intel's D875PB2 board.

Price: $510 **Contact:** Intel **Phone:** (02) 9937 5800 **Web:** www.intel.com.au

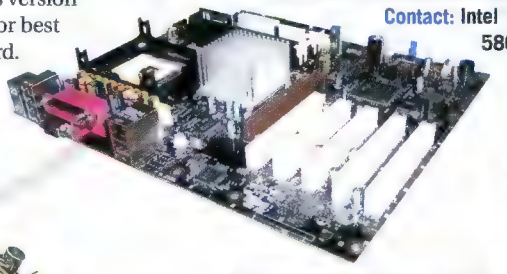


motherboard

Intel D875PBZ

Intel's new high-performance motherboard features RAID, AGP8X and supports the latest C class Pentium 4 processors.

Reviewed: June 2003 **Price:** TBA
Contact: Intel **Phone:** (02) 9937 5800 **Web:** www.intel.com.au

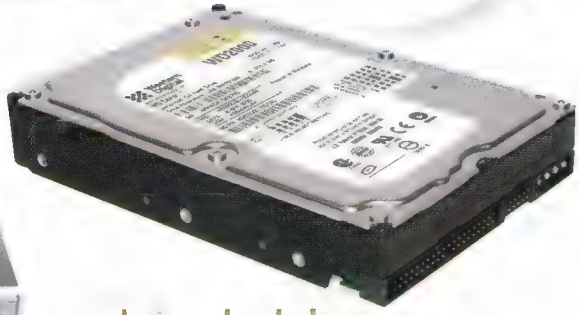


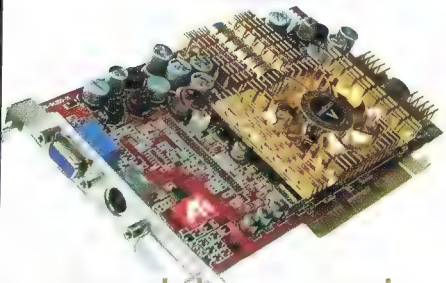
memory

512M of PC3200 DDR

You'll need to use DDR400 (PC3200) memory with a C class Pentium 4. Official PC3200 ratification is still pending, but if you use a reputable brand such as Kingmax, you should be safe.

Price: About $190





graphics card

Radeon 9700 Pro

After a shaky start, ATI's 9700 Pro is now clearly the best-performing graphics chip for 3D games at a half- decent price.

Price: Around $680

dvd burner

Sony DRU-500A

Why settle for a CD burner when this DVD burner will do just about everything: DVD+R/RW, DVD-R/RW, CD-R and CD-RW?

Reviewed: December 2002 **Price:** $899
Contact: Sony **Phone:** 1300 137 669
Web: www.sony.com.au

hard drive

Western Digital Caviar WD2000JB 200G

This 7,200rpm ATA/100 drive blitzed the field in our performance tests. Seriously big and fast.

Reviewed: March 2003 **Price:** $490
Contact: Westan **Phone:** (03) 9543 7733 **Web:** www.westerndigital.com

I need a notebook with a two hour repair service warranty.

For most businesses, down time is costly. That's why we provide a unique 2 hour Commitment Warranty Express Service** on all Acer notebooks - such as the TravelMate 284XC powered by the Mobile Intel® Pentium® 4 Processor - M. Simply take your notebook to any Acer repair centre in Australia or New Zealand** and we guarantee to have you up and running again in 2 hours or less. Acer is the only PC vendor to offer this warranty.

I like to configure my own solutions.

It's easy to build your own computer with Acer. Simply go to www.acer.com.au, click on ShopAcer, and select the Acer product closest to your requirements. Then, choose from a range of options using the drop down menus to build the ideal customised solution for you. An on-line glossary explains each upgrade in plain English, so you can't go wrong. When you're finished, you can buy online, over the phone or save your configuration and take it to your nearest authorised dealer.

My company needs back-up 24 x 7.

If you purchase an Acer server such as the Altos G300 powered by the Intel® Pentium® 4 Processor, it is backed by Acer's 24 x 7 service hotline. So, in the unlikely event that you do encounter a problem, you can call anytime and one of our experienced technicians will help work through the problem with you on the spot.

All-in-one Business Notebook

TravelMate 234XC

BONUS CARRY CASE†
UPGRADE TO MICROSOFT® WINDOWS® XP PROFESSIONAL FOR $150 RRP INC GST†
Mobile Intel® Celeron® Processor 2.2GHz
14.1" active colour screen
256MB DDR SDRAM
20GB hard disk drive
8 x DVD + 24 x 10 x 8 x CD-RW combo
1.44 floppy disk drive
Internal 56K modem + broadband ready 10/100 LAN
Microsoft® Windows® XP Home
2 Hour Commitment Warranty Express Service**

RRP inc GST from $20.03 per week*
Please quote e-Code TM2320

$2,399

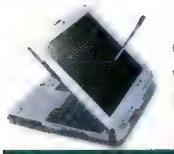
All-in-one Performance Notebook

TravelMate 284XC

BONUS CARRY CASE†
UPGRADE TO MICROSOFT® WINDOWS® XP PROFESSIONAL FOR $200 RRP INC GST†
Mobile Intel® Pentium® 4 Processor 2.2GHz - M
14.1" active colour screen
256MB DDR SDRAM
30GB hard disk drive
8 x DVD + 24 x 10 x 8 x CD-RW
1.44 floppy disk drive
Internal 56K modem + broadband ready 10/100 LAN
Microsoft® Windows® XP Home
2 Hour Commitment Warranty Express Service**

RRP inc GST from $22.53 per week*
Please quote e-Code TM2811

$2,699



Covertible Tablet PC with Intel® Centrino™ Mobile Technology

TravelMate C110TCi

3 MONTH UNLIMITED BROADBAND WIRELESS ACCESS TO SKYNETGLOBAL® IN AUSTRALIA†
Intel® Centrino™ mobile technology
Intel® Pentium® M processor 900MHz
Intel® 855GM Chipset
Intel® PRO/Wireless Network Connection 802.11b
10.4" active colour rotatable screen
512MB DDR SDRAM
40GB hard disk drive
External 8 x DVD + 24 x 10 x 8 x CD-RW combo
Internal 56K modem + broadband ready 10/100 LAN
Microsoft® Windows® XP Tablet PC Edition
2 Hour Commitment Warranty Express Service**

RRP inc GST from $33.39 per week*
Please quote e-Code TMC113

$3,999

Great value desktop

AcerPower ST

Intel® Pentium® 4 Processor 2.6GHz
256MB DDR SDRAM
40GB hard disk drive
48 x 24 x 48 x CD-RW + 16 x DVD combo drive
Integrated AC '97 audio
Integrated 10/100M LAN - Broadband Internet ready
Ultra AGP II video technology (AGP 8x equivalent for 3D/2D video applications)
Microsoft® Windows® XP Professional
Acer 17" monitor
3 year limited (1 year on-site) warranty

RRP inc GST from $12.52 per week*
Please quote e-Code STB012

$1,499

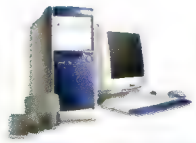
Great value desktop 15" LCD monitor

AcerPower ST

Intel® Pentium® 4 Processor 2.6GHz
256MB DDR SDRAM
40GB hard disk drive
52 x 24 x 52 x CD-RW
Integrated AC '97 audio
Integrated 10/100M LAN - Broadband Internet ready
Ultra AGP II video technology (AGP 8x equivalent for 3D/2D video applications)
Microsoft® Windows® XP Professional
Acer 15" LCD monitor
3 year limited (1 year on-site) warranty

RRP inc GST from $15.02 per week*
Please quote e-Code STB013

$1,799



Top performance desktop

Veriton 7600G

Intel® Pentium® 4 Processor with HT Technology 3.0GHz (800MHz FSB)
1024MB DDR400 SDRAM
120GB 7200rpm hard disk drive
48 x 24 x 48 x CD-RW + 16 x DVD combo drive
Integrated AC '97 audio
3 piece desktop speakers (including sub-woofer)
Integrated 10/100/1000 LAN - Broadband Internet ready
128MB GeForce FX5200 AGP 8x graphics card
Microsoft® Windows® XP Professional
Acer 17" monitor
3 year limited (1 year on-site) warranty

RRP inc GST from $27.54 per week*
Please quote e-Code V7603

$3,299

Performance and value server

Altos G300

ADD MICROSOFT® WINDOWS 2003 SERVER FOR ONLY $1,299 RRP INC GST†
Intel® Pentium® 4 Processor 2.4GHz
128MB ECC DDR RAM
Dual Channel IDE RAID controller
3 channel intergrated IDE controller
Integrated Intel® Gigabit ethernet controller
52 x CD-ROM
300 watt power supply
3 year on-site warranty with 24 x 7 hotline support

RRP inc GST from $10.85 per week*
Please quote e-Code AAG3501

$1,299

Rack optimised performance server

Altos R300

ADD MICROSOFT® WINDOWS 2003 SERVER FOR ONLY $1,299 RRP INC GST†
Intel® Pentium® 4 Processor 2.4GHz
128MB ECC DDR RAM
1 x 40GB hard disk drive
2 x Integrated Intel® Gigabit ethernet controller
300 watt power supply
3 year on-site warranty with 24 x 7 hotline support

RRP inc GST from $18.36 per week*
Please quote e-Code AAR3502

$2,199

Maximum scalability server

Altos G510

ADD MICROSOFT® WINDOWS 2003 SERVER FOR ONLY $1,299 RRP INC GST†
Intel® Xeon™ Processor 2.4GHz
Dual processor capable
128MB ECC DDR RAM
1 x 36GB Ultra 320 SCSI hard disk drive
Integrated 10/100/1000 ethernet controller
54 x CD-ROM
1 x 450 watt hotswap power supply
3 year on-site warranty with 24 x 7 hotline support

RRP inc GST from $25.04 per week*
Please quote e-Code AAG5502

$2,999

shopAcer

www.acer.com.au

1300 366 567

Authorised Dealers

Acer recommends Microsoft® Windows® XP Professional for Business.

Intel, the Intel Inside Logo, Intel Centrino, Pentium, Celeron and Intel Xeon are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. ©2003 Acer, Inc. All rights reserved. Acer and the Acer logo are registered trademarks and AcerPower, TravelMate, Veriton and Altos are trademarks of Acer Inc. Product specifications and recommended retail prices are subject to change without prior notice. All other products, brand names, company names and logos are trademarks of their respective companies. Pictures are for illustrative purposes only.

**Terms and conditions apply - warranty locations also available on website. See www.acer.com.au for full details. †Valid until 11 August 2003 or while stocks last. *Rental amounts shown are indicative and based upon a 36-month rental contract and rates at time of publication; all state and federal government charges (Stamp Duty & GST) included. Rental figures quoted are for business use only and require a minimum purchase of $2000 ex GST. All rentals are subject to credit approval. Provided by Acer Finance Australia Pty Ltd. Individual dealers may offer alternative financing options.

W5 Group ACE223/PCU

acer
Empowering People

CD burners for all needs

With CD burners now faster and better than ever, and priced as low as $79, why wouldn't you buy one? John Hepworth tests a broad range of internal and external drives.

TECH TERMS

Buffer underrun. A problem that plagued the first wave of fast burners some years back. All burners use memory buffers to hold the data ready to be written to disc. Buffer underrun errors occurred when the computer couldn't keep up with the burner, allowing the buffer to empty and ruining the CD-R in the process. That's why all CD burners now come with some type of buffer underrun protection. This technology can vary subtly between drives, but all work much the same way: by monitoring the contents of the buffer, and if it drops too far, pausing the burn until the buffer refills.

What a difference a year makes. Since our last major comparison of CD-R/RW drives, this time last year, the drives have become better and faster — and they're about half the price. Falling prices have forced makers to cut some costs. For example, some drives no longer come with blank discs, and some don't even come with IDE cables or other installation hardware. However, they still come with the essential CD burning software and the drives are generally significantly better. As well as being about 30% faster than last year's models, they often come with features such as RAW mode direct CD copying, which you won't find in many old burners.

We tested 20 drives for this feature. Nine were internal drives and eight were external. The final three drives were CD-R/RW/DVD combos, able to read CDs, write CD-Rs and CD-RWs, and read DVDs — a very flexible solution for your optical storage needs and, priced from $139, great value, too.

Which interface?

Buying an external burner is without a doubt the easiest solution. All the external drives we tested had USB 2.0 Hi-Speed interfaces, with one having both USB 2.0 and FireWire. The USB interface makes them compatible with all PCs made in the last five or six years, but your computer will need to support USB 2.0 to get anything near the top burn speeds. If you've only got USB 1.1 ports, you'll be lucky to get a quarter of the potential speed.

Of course, you can add USB 2.0 interfaces with an expansion card, but that's an extra cost on top of the higher price of an external burner. You can buy at least three internal drives for the cost of one external burner, so you'll really need to have that portability to make an external burner worth the extra cost.

All the internal drives were standard IDE drives, compatible with virtually all desktop PCs. We recommend novices get expert assistance, but the internal drives are easy to install if you're fairly handy.

To burn at full speed with today's drives, you'll need a PC with a fast CPU and a fast hard drive. A CD burner at 52x will consume data on outer tracks at an average almost 8M per second, with peaks far higher than this. Of course, if your PC struggles to keep up, you can always drop back to lower burn speeds.

Speed to burn

How important is the burn speed of the drive? That's up to you, but we can tell you there are significant differences — not so much between today's internal drives but between the external drives. In our tests, there was a 25% difference in CD-R burn speed between the slowest of the external drives and the fast external drives, which in turn were roughly on a par with the internal drives. That would save about 30 seconds on a 60-minute audio CD.

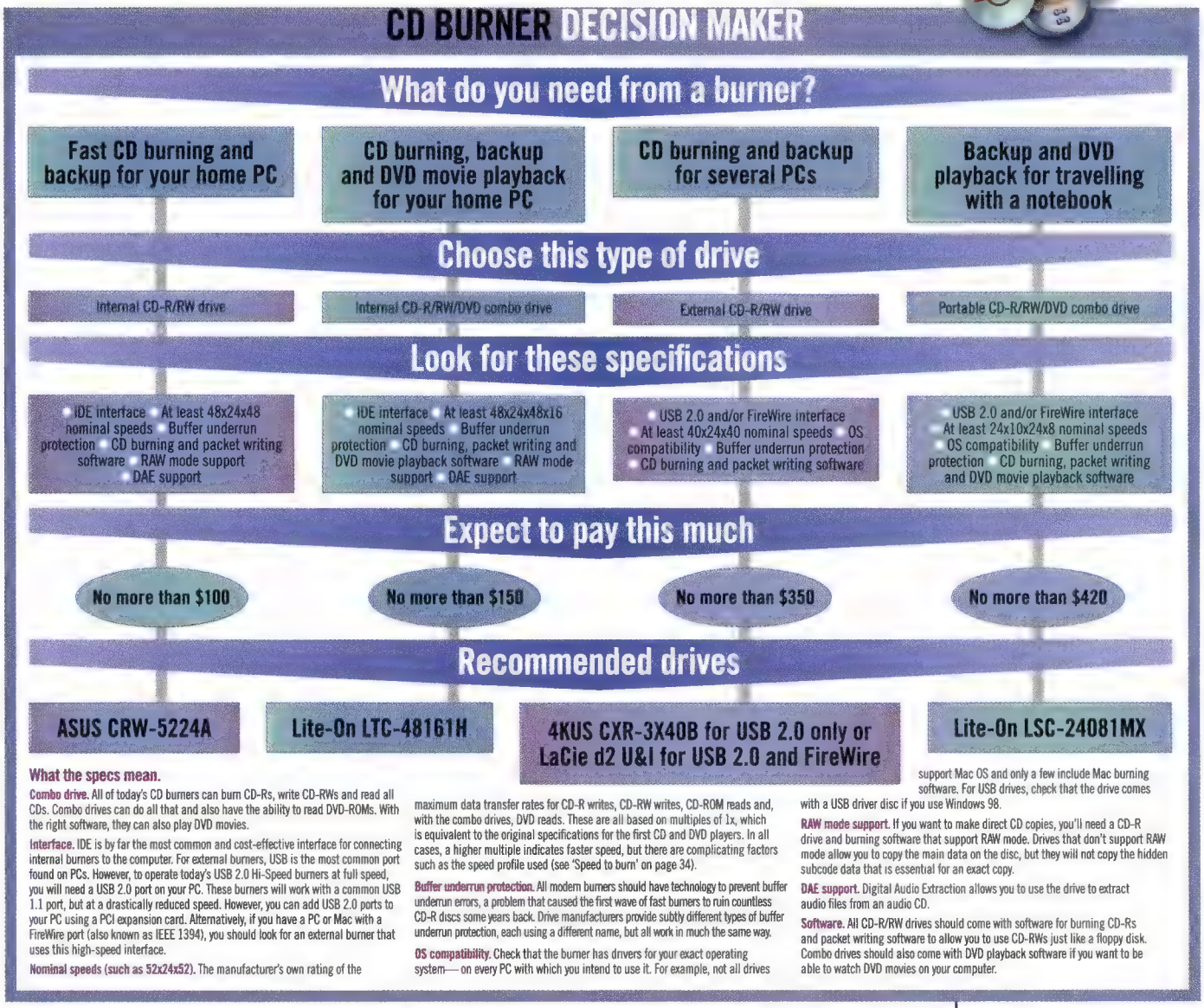
With CD-RW writes, the differences are even more pronounced, with some drives more than doubling the CD-RW transfer rates achieved by others. That's a time saving of around four minutes for a full disc — a godsend if you backup regularly (as you all do, right?).

Of course, the most obvious indicators of the various speeds of a drive are the nominal speeds, as rated by the manufacturer. Our performance tests confirm that the nominal speeds usually, but not always, show the relative performance differences between drives. For example, a 52x CD-R burner is almost always at least twice as fast as a 24x burner.

However, the nominal speeds represent the maximum data transfer rate that the drive is capable of, and our tests show that the average rate across an entire disc is usually significantly lower. For example, burning a full CD-R disc will usually result in an average transfer rate of between 70% and 80% of the nominal CD-R burn speed. On the other hand, some drives are capable of nearly 100% of the nominal rate when writing a full CD-RW disc.

These discrepancies are basically due to the shape of the disc, with inner tracks about half the length of the outer tracks, and the different techniques, or speed profiles, used to overcome the various problems this causes. Here's a guide to the speed profiles used.

- **CLV (Constant Linear Velocity).** Used by audio CD players, this technique changes the revolutions per minute (rpm), allowing more music to be packed on the disc. The drive reads (or writes) from the inner edge near the hub to the outer edge at the rim, and it constantly slows the rpm so that the linear speed (in millimetres per second) is the same on the longer outer rim as it is near the hub. CLV is rarely used for CD-ROM reading or CD-R burning these days, but it is often used for CD-RW writes.
- **Z-CLV (Zoned Constant Linear Velocity).** This profile uses CLV, but within several 'zones' on the disc, rather than across the whole disc. It starts reading (or writing) near the hub, with rpm gradually slowing to keep the same linear velocity. When it reaches another zone, the rpm steps up to provide a higher linear velocity, with rpm then gradually slowing within that zone. The process is then repeated a couple more times. Z-CLV is used by some slower or



What the specs mean.

Combo drive. All of today's CD burners can burn CD-Rs, write CD-RWs and read all CDs. Combo drives can do all that and also have the ability to read DVD-ROMs. With the right software, they can also play DVD movies.

Interface. IDE is by far the most common and cost-effective interface for connecting internal burners to the computer. For external burners, USB is the most common port found on PCs. However, to operate today's USB 2.0 Hi-Speed burners at full speed, you will need a USB 2.0 port on your PC. These burners will work with a common USB 1.1 port, but at a drastically reduced speed. However, you can add USB 2.0 ports to your PC using a PCI expansion card. Alternatively, if you have a PC or Mac with a FireWire port (also known as IEEE 1394), you should look for an external burner that uses this high-speed interface.

Nominal speeds (such as 52x24x52). The manufacturer's own rating of the maximum data transfer rates for CD-R writes, CD-RW writes, CD-ROM reads and, with the combo drives, DVD reads. These are all based on multiples of 1x, which is equivalent to the original specifications for the first CD and DVD players. In all cases, a higher multiple indicates faster speed, but there are complicating factors such as the speed profile used (see 'Speed to burn' on page 34).

Buffer underrun protection. All modern burners should have technology to prevent buffer underrun errors, a problem that caused the first wave of fast burners to ruin countless CD-R discs some years back. Drive manufacturers provide subtly different types of buffer underrun protection, each using a different name, but all work in much the same way.

OS compatibility. Check that the burner has drivers for your exact operating system— on every PC with which you intend to use it. For example, not all drives support Mac OS and only a few include Mac burning software. For USB drives, check that the drive comes with a USB driver disc if you use Windows 98.

RAW mode support. If you want to make direct CD copies, you'll need a CD-R drive and burning software that support RAW mode. Drives that don't support RAW mode allow you to copy the main data on the disc, but they will not copy the hidden subcode data that is essential for an exact copy.

DAE support. Digital Audio Extraction allows you to use the drive to extract audio files from an audio CD.

Software. All CD-R/RW drives should come with software for burning CD-Rs and packet writing software to allow you to use CD-RWs just like a floppy disk. Combo drives should also come with DVD playback software if you want to be able to watch DVD movies on your computer.

older drives for CD-R and CD-RW writes.

- **CAV (Constant Angular Velocity).** This profile keeps the same rpm across the disc, producing a data transfer rate at the rim about twice that at the hub. CAV is by far the most common profile for high-speed CD-R burning and CD-ROM reading, and is often used for CD-RW writes.
- **P-CAV (Partial Constant Angular Velocity).** With this profile, drives start with constant angular velocity and maintain it partway across the disc. Then they switch to constant linear velocity. P-CAV is often used for CD-RW writes and by some drives for CD-R burning.

Which speed profile should you look for? That depends on the task. For example, our tests show that CLV and P-CAV are clearly the most efficient profiles for CD-RW writing. The 24x drives that use either of these profiles averaged rates above 23x and were up to 40% faster than 24x drives that use CAV for CD-RW.

With CD-R burns, none of the profiles appear to be more efficient than the others, with drives using CAV, P-CAV and Z-CLV for CD-R all averaging between 70% and 80% of the nominal rates. However, Z-CLV is clearly limited, as nearly all 48x or faster CD-R drives now use CAV or P-CAV.

What to look for

For some users, the drive's features will be more important than its speed.

- **Software.** A CD burner won't work without software and all burners come with the CD burning and packet writing software essential for writing CD-Rs and CD-RWs. Nero Burning ROM is the most common burning software bundled with CD burners and it's a very powerful program that is capable of doing a lot of preparatory work for mastering audio CDs. The bundled version of Easy CD Creator is fine and very easy to learn, but it's missing the advanced audio features found in Nero or the retail version of Easy CD. B's Recorder GOLD is good, but also isn't as fully featured as Nero.
- **DAE.** All of the tested drives supported DAE, allowing you to extract audio files from an >>>

TECH TERMS

CD-R/RW (Compact Disc Recordable/ReWritable). CD-R is a write-once CD standard, commonly used for creating compilation audio CDs and file archives. CD-RW is a CD standard that allows the disc to be written to about 1,000 times, making it ideal for backing up data.

FireWire or IEEE 1394. A high-speed interface for connecting peripherals such as digital video cameras to computers. More common on Macs than PCs.

PLAY IT AGAIN

TECH TERMS

IDE (Integrated Drive Electronics). By far the most common interface for connecting internal storage devices, such as hard drives and CD drives, to the computer.

Nominal speeds (such as 52x24x52). The manufacturer's own rating of the maximum data transfer rates for CD-R writes, CD-RW writes, CD-ROM reads and, with the combo drives, DVD-ROM reads. These are all based on multiples of 1x, which for the various types of CDs is equivalent to 150Kbps, the original specification for audio CD players. With DVD reading and writing, 1x represents 1,250Kbps.

USB (Universal Serial Bus). A very common serial connection used by printers, digital cameras and many other peripherals. USB 2.0 ports offer 40 times faster connection speeds than USB 1.1 when used with USB 2.0 Hi-Speed devices.

«««

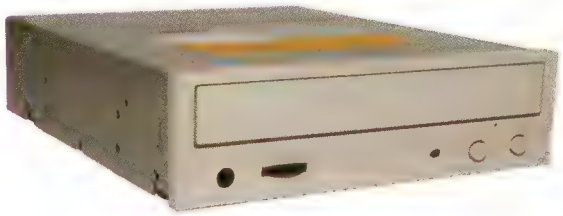
audio CD. We tested DAE performance of all drives with Nero CD Speed. All but the MSI drives got a rating of 10 from CD Speed. The two MSI drives failed this test, but we could still extract audio from them.

- **RAW mode.** If you want to make direct and exact CD copies, you'll need a CD-R drive and burning software that support RAW mode. Of course, you should be aware of the legalities of direct CD copying and that it may not always work with copy-protected discs.
- **Mount Rainier.** This is a new standard being pushed by Philips that will provide background formatting and defect management for CD-RW and DVD+RW discs. This will make using Mount Rainier-formatted rewritable discs easier to use, perhaps making packet writing software and the old floppy drive obsolete (see **www.licensing.philips.com/information/mtr** for more information). Current versions of Windows do not have built-in Mount Rainier support, but it is expected to be part of the next version of Windows.
- **Form factor.** All of the tested internal drives used tray disc-loading mechanisms, which is perfect for horizontal mounting typically used on most PCs. However, if you want to be able to install the drive vertically, look for disc retainer tabs.

With external drives, you'll find three basic physical sizes. The large burners use standard IDE drive mechanisms, wrapped in an external case. Small burners use notebook drive mechanisms, allowing them to be about the same size as a personal CD audio player. The premium you pay for this portability is that they're usually significantly slower than the full-size burners. Then there are drives between those two extremes, which offer a good compromise.

INTERNAL CD BURNERS

AOpen CRW5224WU



RATING 7 **Price:** $119.95 **Contact:** Bluechip Infotech **Phone:** (02) 8745 8400 **Web:** www.aopen.com
✔ Excellent CD-R burn speed ✔ Nero burning software
✘ Sluggish CD-RW performance

AOpen supplied an engineering sample of this standard 52x24x52 IDE drive, as retail boxes had not yet arrived in Australia. So, we can't say if it will include installation hardware such as cables and screws, or if it supports RAW-mode direct CD copying. The sample drive also came without a manual, though an installation leaflet is expected with the final product. We can report that the CRW5224WU was among the fastest CD-R burners, averaging over 39x. Unfortunately, its CD-RW write speed was the slowest of the internal drives, averaging under 17x, with the drive using the CAV speed profile for CD-RW writes. However, the drive uses both JustLink and JustSpeed technologies for buffer underrun protection, and includes the excellent Nero burning software. All in all, the CRW5224WU is a good, fast drive if CD-R burning is your top priority, but it is rather expensive.

ASUS CRW-5224A

RATING 10 **Price:** $79 **Contact:** Achieva **Phone:** (02) 9742 3288 **Web:** www.asus.com.tw ✔ Excellent CD-R and CD-RW speed ✔ RAW mode support ✔ Comprehensive kit

Being the cheapest burner in this feature, we were expecting some compromises with the CRW-5224A. We didn't find any. Unlike some other internal drives, it features a comprehensive kit including an IDE cable, audio cable and mounting screws, and the tray has disc retainers, allowing vertical or horizontal mounting. A blank CD-R, CD-RW and Nero Burning ROM software is also included. The manual is brief, but it covers installation well. And the CRW-5224A is fast. Rated at 52x24x52, it produced an average CD-R burn rate of a fraction under 40x in our tests, one of the fastest in this comparison. Its CD-RW write speed was also exceptional, averaging just below the rated 24x. The drive supports RAW mode for direct CD copying and has FlextraLink and FlextraSpeed buffer underrun protection. It also has Mount Rainier support, which may come in very handy when future operating systems start supporting this standard for rewritable discs. For CD-R burns or CD-RW backups, the CRW-5224A can't be faulted — and priced at $79, it's a steal.

BenQ CRW5224W

RATING 7 **Price:** $99 **Contact:** BenQ **Phone:** (02) 9714 6800 **Web:** www.benq.com.au ✔ Fast CD-RW writes
✔ RAW mode support ✘ Below-par CD-R speed

This 52x24x52 IDE drive has just about everything you need, including an audio cable and mounting screws, but there is no IDE cable. An ultra-speed CD-RW disc and Nero burning software is also provided. The drive is easy to install, and the instruction leaflets are brief, but cover the basics of hardware installation and getting started with the bundled software. The drive also supports RAW mode and uses Seamless Link III for buffer »»

EPSON INK NON-EPSON INK

It's only a matter of time before the wrong ink can damage your printer

FOUR GENUINE FACTS. HOW NON-EPSON INKS CAN RUIN YOUR PRINTER.

SAVE MONEY
Non-genuine inks are not as cheap as you think.

Genuine EPSON inks can give you more than twice as many printouts per cartridge than non-genuine cartridges.
Non-genuine inks can be up to 40% more expensive than Genuine EPSON inks.*

*Figure based on EPSON testing on cost per printed page.
Refer to www.epson.com.au for EPSON's test details.

NUMBER OF PRINTOUTS PER CARTRIDGE

ACHIEVE BEST QUALITY OUTPUT
Genuine EPSON inks and ink cartridges always ensure best quality.

EPSON manufacture only genuine EPSON inks, which are specifically designed for each printer to meet exact formulations critical to achieving hassle free, best quality output. Lightfastness, gas-fastness, quick drying, water resistance and vivid colours are features of genuine EPSON inks.
Non-genuine manufacturers do not guarantee Lightfastness, gas-fastness, quick drying inks, water resistance or vivid colours.

+Refer to www.epson.com.au for EPSON's test details.

With Genuine EPSON ink there is very little fading.

Fading can be excessive with non-genuine inks.

PROBLEM FREE - WORKS EVERY TIME
Genuine EPSON inks are problem free - reliable and dependable.

No leakages. No dry ink in the cartridge. No clogged print heads. No problems!
Non-genuine cartridges can leak – provided they even work in the first place. Ink can dry up. Print heads can clog. Lots of problems!

Refer to www.epson.com.au for EPSON's test details.

AVERAGE NUMBER OF PRINT HEAD CLEANS REQUIRED PER CARTRIDGE

PRINTER DAMAGE PROTECTION
Don't take the risk with non-genuine inks, in or out of warranty.

Genuine EPSON inks can prolong the life of your printer. Clean genuine EPSON ink contained in cartridges that feature high quality filters actually work to protect the printer and its print head.
Non-genuine inks can lack the cleanliness and technology needed for EPSON's finely tuned inkjet printers. Without these, the print head could be damaged and cost you for repair.

1. Close up picture of actual ink feed needle which carries the ink to the printer.

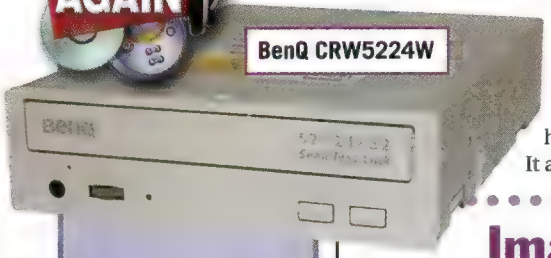
2. Close up of actual ink feed needle which has been damaged from using a non-genuine ink cartridge.

FOR HIGHEST QUALITY DEMAND EPSON INKS+PAPERS
www.epson.com.au

FOR HIGHEST QUALITY OUTPUT TRUST THE HIGHEST QUALITY INPUT. USE GENUINE EPSON INKS+PAPERS.

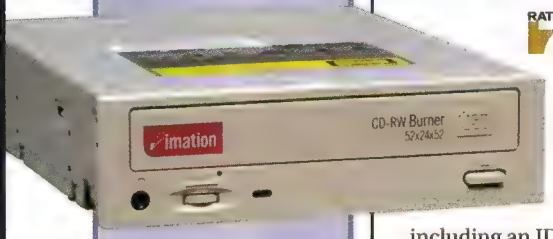
EPSON®

PLAY IT AGAIN



underrun protection. In our tests, the CRW5224W never reached its rated 52x CD-R burn speed, hitting a maximum of just over 48x. It averaged 37x for the whole CD-R, which isn't bad, but lagged behind the fastest burners. However, its CD-RW write speeds were excellent, almost averaging the rated 24x. Consequently, we can recommend the CRW5224W as a great backup tool, but it's not the fastest burner in this roundup.

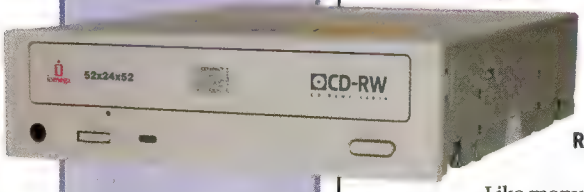
Imation 52x24x52 Internal CD-RW Drive



RATING 7 **Price:** $119 **Contact:** Imation **Phone:** (02) 8858 3000 **Web:** www.imation.com.au ✓ Fast CD-R burns ✓ Good kit ✗ Relatively expensive

This burner costs a bit more than some of the other internal 52x24x52 drives, but it has a comprehensive kit including an IDE cable, audio cable, a pack of mounting screws, Nero burning software and disc retainers to allow vertical or horizontal mounting. There's buffer underrun protection, but it doesn't appear to support RAW mode. Its CD-R burn speed was excellent, averaging over 39x for a full disc, but unfortunately, the drive uses the CAV profile for CD-RW writes. Consequently, its writes averaged just over 18x in our tests — about 25% slower than some other 24x CD-RW drives, but certainly a lot better than old 10x or 12x CD-RW writers. On the whole, this is a good drive and its only real problem is its price. There are cheaper burners in this roundup that offer more.

Iomega CD-RW 52x24x52 Internal Drive



RATING 7 **Price:** $149 **Contact:** Iomega **Phone:** (02) 8875 7851 **Web:** www.iomega.com ✓ Fast CD-R burns ✓ Supports RAW mode ✗ Expensive

Like many Iomega products, this drive is fully priced, but you get a lot for the money: a 52x24x52 internal drive with an IDE cable, audio cable, a pack of mounting screws and Nero burning software. It has buffer underrun protection, but it doesn't seem to support RAW mode. It is also a very fast burner, with an average CD-R burn speed of over 39x. It uses the CAV profile for CD-RW writes and its average CD-RW speed was just over 18x in our tests. That's not bad, but it's about 25% slower than some CD-RW writers. Despite that, this is a good kit, but priced at $149, Iomega will need to sharpen its pencils to compete.

Lite-On LTR52246S

RATING 9 **Price:** $99 **Contact:** Synnex **Phone:** 1300 880 038 **Web:** www.liteonit.com ✓ Fast CD-R burns ✓ RAW mode supported ✗ Not the fastest CD-RW speed

Lite-On has quickly gained a reputation for offering great-value drives and this one is no different. It's priced at just $99, but it's not short on features. The 52x24x52 internal drive comes with Nero burning software, a blank CD-R, a blank CD-RW, an audio cable and mounting screws, but no IDE cable. It supports RAW mode direct CD copying, has Mount Rainier rewritable disc support, and uses SMART-BURN buffer underrun protection. The LTR52246S was among the fastest at CD-R burns, with an average speed of over 39x in our tests. However, like other drives that used the CAV profile for CD-RW writes, its average speed was just over 18x — not bad, but significantly behind the fastest. That aside, the LTR52246S is hard to fault and the price is right. However, the Lite-On misses a Top Buy this time, because the ASUS CRW-5224A offers better value.

Mitsubishi Diamond Data DD522452-161

RATING 7 **Price:** $99 **Contact:** Mitsubishi Electric **Phone:** (02) 9684 7777 **Web:** www.mitsubishi-electric.com.au ✓ Good performance ✓ Reasonable price ✗ Sensitive to CD-R type

The DD522452-161 offers plenty for the money: an internal tray-loading drive with disc retainers for vertical or horizontal mounting, Nero burning software, and two brief leaflets covering drive installation and getting started with Nero. BurnProtection technology is used for buffer underrun protection, but there's no support for RAW mode. The 52x24x52 drive was quite fast, but it was sensitive to the CD-R discs used. Using the same type of CD-R as with the other 52x drives, there was a normal CAV profile for the first 75% of the disc, then it dropped to a lower speed and used CLV. Using another brand of disc, there was a normal CAV profile across the whole disc. Using the alternative type of CD-R, the drive's burn speed was only just below the fastest drives, averaging just under 39x. The CD-RW write speed was excellent, averaging just under the rated 24x. Overall, this is a good, fast drive at a fair price, but be careful what CD-Rs you use.

PLAY IT AGAIN

MSI CR52-M

RATING 8 Price: $100 Contact: MSI Phone: (02) 9748 0070 Web: www.msicomputer.com.au ✔ Fast CD-R burns ✔ Great CD-RW speed ✘ Failed DAE test

This competitively priced 52x24x52 internal drive from MSI offers plenty for the money, including disc retainers for optional vertical mounting, Nero burning software, an audio cable, mounting screws, but no IDE cable. It doesn't appear to support RAW mode, but it uses BURN-Proof buffer underrun protection. The CR52-M was also among the best performers for both CD-R burns and CD-RW writes, averaging over 39x for the former and just under 24x for the latter. Unfortunately, it failed Nero CD Speed's DAE test, but we were able to successfully extract tracks from an audio CD. Overall, a very nice drive at a reasonably competitive price.

Sony CRX220A1

RATING 7 Price: $149 Contact: Sony Phone: 1300 137 669 Web: www.sony.com.au ✔ Turbo switch for extra safety ✔ Fast CD-R burns ✘ Expensive

The CRX220A1 is labelled as 52x24x52, but it actually has two modes. As reported in our March issue, there have been occasional reports of discs shattering in very fast drives. So, Sony made the default speed of this drive 40x. But hold in the eject button for five seconds and the drive switches to full 52x mode for both CD-R burns and CD-ROM reads. In default mode, the CRX220A1's CD-R burns reached a maximum speed just under 40x and averaged around 32x for a full disc. In turbo mode, it jumped to just under 52x and just over 39x, respectively — on a par with the fastest CD-R burners. However, the drive's CD-RW write speed lagged behind the top performers, with an average of 18x. The drive comes with an IDE cable, mounting screws, disc retainers for optional vertical mounting, and excellent manuals. It also supports RAW mode, but it comes with B's Recorder GOLD burning software, not Nero. The CRX220A1 is expensive, but it's a good drive and its turbo mode safety feature may be worth the extra money for some.

HOW WE TESTED

We set up a consistent test environment for all drives. This comprised a 2.4GHz Pentium 4 system with 512M of RAM and Windows XP Professional. We used Nero CD Speed benchmarking software to test and graph CD-R write, CD-RW write and CD-ROM read speeds for all drives, using full discs. Nero CD Speed also tested DAE (Digital Audio Extraction). We then burnt CDs with the software bundled with each drive. The comparison tables provide three results for each test: the transfer rate at the start of read or write, the rate at the end, and the average rate for the full disc. The test results are in multiples of 1x CD speed, which is equivalent to 150Kbps. In all cases, the higher the multiple, the faster the drive.

EXTERNAL CD BURNERS

4KUS CXR-3X40B

RATING 9 Price: $239 Contact: Synnex Phone: 1300 880 038 Web: www.4kus.com.tw ✔ Cheapest external drive ✔ Convenient mid-sized burner ✘ Slower than some

Priced at just $239, the CXR-3X40B was the cheapest external burner in this feature, and not surprisingly, it wasn't the fastest. However, it's no slouch, with nominal speeds of 40x24x40, resulting in an average CD-R burn speed of over 31x in our tests. Its average CD-RW write speed of 18x wasn't top-notch, but >>>

INTERNAL BURNERS: HOW THEY COMPARE

	Price	DVD-ROM	Nominal speeds*	CD-R test results			CD-RW test results			CD-ROM test results			Speed profiles			RAW Mode	Mount Rainier	Software	
				Start	End	Avg	Start	End	Avg	Start	End	Avg	CD-R	CD-RW	CD-ROM			CD burn	Packet write
AOpen CRW5224WU	$119.95	No	52x24x52	23.37	51.45	39.19	10.24	22.24	16.96	21.51	47.81	36.29	CAV	CAV	CAV	No	Yes	Nero	InCD
ASUS CRW-5224A	$79	No	52x24x52	23.62	52.13	39.61	22.47	23.79	23.74	22.31	49.51	37.59	CAV	CLV	CAV	Yes	Yes	Nero	InCD
BenQ CRW5224W	$99	No	52x24x52	22.42	48.36	37.46	17.34	24.22	23.4	22.83	47.88	36.39	P-CAV	P-CAV	CAV	Yes	No	Nero	InCD
Imation 52x24x52 Internal CD-RW Drive	$119	No	52x24x52	23.61	51.98	39.52	10.95	23.77	18.12	22.83	49.25	37.41	CAV	CAV	CAV	No	No	Nero	InCD
Iomega CD-RW 52x24x52 Internal Drive	$149	No	52x24x52	23.59	51.95	39.5	10.95	23.76	18.12	22.83	49.23	37.39	CAV	CAV	CAV	No	No	Nero	InCD
Lite-On LTC-48161H	$139	Yes	48x24x48x16	22.18	48.82	37.12	11.14	24.19	18.44	21.36	46.2	35.09	CAV	CAV	CAV	Yes	Yes	Nero	InCD
Lite-On LTR52246S	$99	No	52x24x52	23.54	51.84	39.42	10.92	23.71	18.08	22.79	49.13	37.32	CAV	CAV	CAV	Yes	Yes	Nero	InCD
Mitsubishi Diamond Data DD522452-161	$99	No	52x24x52	23.45	51	38.8	17.32	24.34	23.36	23.03	47.82	36.36	CAV	P-CAV	CAV	No	No	Nero	InCD
MSI CR52-M	$100	No	52x24x52	23.46	51.71	39.31	20.58	23.84	23.65	22.08	49.01	37.27	CAV	P-CAV	CAV	Yes	Yes	Nero	InCD
Sony CRX220A1**	$149	No	52x24x52	23.5	51.9	39.44	10.95	23.78	18.13	22.84	49.3	37.44	CAV	CAV	CAV	Yes	No	B's Recorder GOLD	B's CLiP

* Nominal speeds in this order: CD-RxCD-RWxCD-ROMxDVD-ROM ** Sony CRX220A1 performance scores in Turbo mode

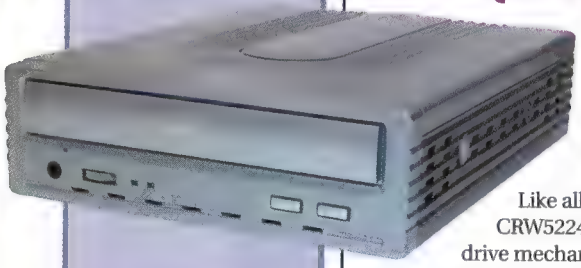
«««

it was far better than some other external models. A mid-sized external burner with a USB 2.0 interface, the CXR-3X40B has a flip-up disc lid on the top of the unit, which is a little less convenient than a tray-loading drive. However, it supports RAW mode for direct CD copying. It also comes with Nero burning software, a USB 2.0 cable, an audio cable, and uses SMART-BURN technology for buffer underrun protection. All in all, it's great value. You won't find a better portable burner for the price.

4KUS CXR-3X40B

1 PC USER TOP BUY

BenQ CRW5224WU



RATING 9 **Price: TBA Contact: BenQ Phone: (02) 9714 6800 Web: www.benq.com.au**
✓ Excellent performance ✓ RAW mode supported ✗ Bulkier than some

Like all full-sized external drives, the CRW5224WU is basically a standard IDE drive mechanism wrapped in an external case, with a USB 2.0 interface. It's a little more compact than some other full-sized externals, but a fair bit bulkier than the likes of the 4KUS drive. However, having the standard mechanism has advantages, too, such as convenient tray loading and fast 52x24x52 nominal speeds. The CRW5224WU can also sit horizontally or vertically on a desk. It supports RAW mode disc copying, and uses Seamless Link III for buffer underrun protection. Nero burning software, a USB cable, a blank CD-R and CD-RW are also included. It's also an excellent performer. Using the USB 2.0 interface, the CRW5224WU's test scores were right up with the best internal burners, averaging over 39x for CD-R burns and just under the nominal 24x for CD-RW writes. The price was still to be set at the time of going to press, but if it's as competitive as BenQ's internal burner, the CRW5224WU will be hard to go past.

Imation 40x24x40 External CD-RW Drive

RATING 7 **Price: $329 Contact: Imation Phone: (02) 8858 3000 Web: www.imation.com.au**
✓ Convenient mid-sized burner ✗ Relatively expensive

This midsized, top-loading USB 2.0 burner comes with everything you need: Nero burning software, USB and audio cables, and RAW mode supported for direct disc copying. It also supports the Mount Rainier standard for more convenient handling of rewritable discs with future operating systems. With nominal speeds of 40x24x40x, it is slower than the full-size external burners, but on a par with the 4KUS midsized external drive. That was reflected in the test results, averaging 31x for CD-R burns and 18x for CD-RW writes. In fact, this Imation drive is very similar to the 4KUS CXR-3X40B in every way except price. At $329, it is almost $100 more than the 4KUS!

Iomega CD-RW 48x24x48 USB 2.0 Drive

RATING 6 **Price: $499 Contact: Iomega Phone: (02) 8875 7851 Web: www.iomega.com**
✓ Good performer ✗ Expensive

This full-sized USB 2.0 burner is based on a standard IDE drive mechanism, but with nominal speeds of 48x24x48, it's a fraction slower than the other full-sized external burners. That was reflected in our testing, with its average CD-R burn speed of 37x not bad, but a little behind the best in this category. Its average CD-RW write speed of just under 19x was also quite good, but again, not among the best due to the use of the CAV profile for CD-RW. The rounded case looks smart, but it only allows the drive to sit horizontally on a desk. Also, the burning software is Iomega's HotBurn rather than Nero, and it does not appear to support RAW mode. However, the audio-out sockets are standard RCA, rather than the miniature phono plugs used on the other external drives, and a socket for a security lock is on the rear panel. All in all, there's little wrong with this burner, except for the price — $499 is a bit rich when you can find similar or better burners for much less.

LaCie d2 U&I CD-RW

RATING 8 **Price: $349 Contact: LaCie Phone: (02) 9669 6900 Web: www.lacie.com.au ✓ USB 2.0 and FireWire**
✓ Fast CD-RW writes ✗ Slower than some

This is a full-sized burner that uses a standard 52x24x52 IDE drive mechanism, but the d2 U&I has an extruded aluminium case. This case can sit flat or, with optional clip-on feet, stand on its side. It can even be rack mounted with optional brackets, or linked to other items in d2 cases. It was the »»

Wireless DualBand/Tri-band

FWAG114
Prosafe Tri-band Wireless VPN Firewall

WAG511
Tri-band Wireless Network Card

WAB102
Access Point

Wireless 802.11g*, 54 Mbps

WG602
Access Point

WG511
PC Card Notebook Adaptor

WGR614
Cable/DSL Router

VPN Security - Wireless

FVM318
Cable/DSL Firewall Router

Wireless 802.11b, 11 Mbps

DG824M
Wireless ADSL Modem/Internet Gateway

MR814
Cable/DSL Router

MA401
PC Card Notebook Adaptor

Networking through the air with the greatest of ease.

If you want to extend your existing Ethernet network or set up a new network quickly, easily and affordably, NETGEAR wireless is the answer.

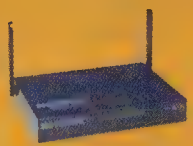
Wireless technologies allow you to build a network for speed and mobility without the inconvenience of installing cabling. Easily integrate wireless and Ethernet wired technologies using an access point or choose a wireless router for a faster Internet connection.

Consider the latest in secure wireless communications with NETGEAR's new 54Mbps wireless technology. These products are ideal for companies and individuals seeking a high speed wireless networking solution that enable multiple computers to share files, peripherals and access to the internet easily.

NETGEAR manufacture a range of wireless products to support 802.11b, 802.11a and the newer 802.11g* standards.

To learn more, visit **www.netgear.com.au**

*This product has been designed and developed to the draft IEEE specification for the 802.11g standard.



cnet Editors' Choice MAY 2003

Wi Fi The Standard for Wireless Fidelity.

NETGEAR®

Everybody's connecting.

Pre-Sales 1800 502 061 **Web www.netgear.com.au**

©2003 NETGEAR, Inc. NETGEAR is a registered trademark and "Everybody's connecting" and "Gear Guy" design are trademarks of NETGEAR, Inc. All rights reserved. Other brand and product names are trademarks or registered trademarks of their respective holders.

LaCie d2 U&I CD-RW

only tested drive to feature dual interfaces — USB 2.0 and FireWire — and it's compatible with both Mac and Windows. The d2 U&I comes with USB and FireWire cables, a blank 52x CD-R, Easy CD Creator software for Windows and Toast for Macintosh. It also supports RAW mode and Mount Rainier. When tested using the USB 2.0 interface, the d2 U&I fell short of the maximum stated CD-R burn speed of 52x. This brought its average CD-R speed down below 37x — not bad, but a bit below the other 52x burners. However, its CD-RW write speed was among the best, averaging just under the nominal 24x. The $349 asking price is reasonable when you consider all the features. If you're looking for a fast external burner to back up a combination of PCs and Macs, you won't find better than this.

Lite-On LXR-40243A

RATING 8 Price: $259 Contact: Synnex Phone: 1300 880 038 Web: www.liteonit.com
✓ Good price ✓ More portable than some ✓ Slower than some

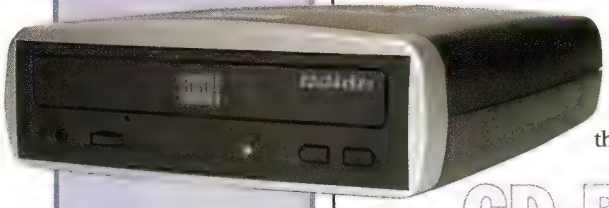
The LXR-40243A is a midsized, top-loading USB 2.0 burner with a comprehensive kit, including a USB cable, blank CD-R and CD-RW discs, and Nero burning software. RAW mode and Mount Rainier are also supported. The nominal speeds of 40x24x40 are typical of most external burners of this size. Its test results were very similar to the other two midsized drives in this feature, with an average CD-R burn speed of just over 31x and an average CD-RW write speed of 18x. Some may prefer the tray-loading mechanisms used by the larger burners, but the LXR-40243A is significantly smaller and more portable. Priced under $250, it's great value.

Mitsubishi Diamond Data D522452UE-158

RATING 8 Price: $259 Contact: Mitsubishi Electric Phone: (02) 9684 7777 Web: www.mitsubishi-electric.com.au
✓ Excellent performer ✗ Sensitive to type of CD-R

This full-sized USB 2.0 burner uses a standard IDE 52x24x52 drive mechanism. A pair of clip-on feet allow it to also stand vertically. A USB cable, Nero burning software and a blank CD-R and CD-RW are also provided, but RAW mode is not supported. This drive was sensitive to the type of CD-R used. It had to drop the speed significantly to burn with the type of CD-R that we used for testing the other burners. However, using another type of disc, it was very quick, with an average CD-R burn speed of over 39x. CD-RW writes were also among the fastest, with an average of just under the 24x nominal speed. The D522452UE-158 is very good value, but you'll need to be careful about what type of CD-R you use.

MSI CR52-A2



RATING 8 Price: TBA Contact: MSI Phone: (02) 9748 0070 Web: www.msicomputer.com.au
✓ Fast CD-R burns ✓ Fast CD-RW writes ✗ Bulky

The CR52-A2 is a full-sized USB 2.0 burner that uses a standard 52x24x52 IDE drive mechanism. However, the case is a bit bigger than some full-sized drives and it can only sit horizontally. RAW mode doesn't appear to be supported, and the drive uses BURN-Proof buffer underrun protection. Nero burning software is also included. Like the internal MSI model, this failed Nero CD Speed's DAE test, but we were able to successfully extract tracks from an audio CD. Its other performance results were excellent, with its 39x average for CD-R burns among the best in this comparison, as was its average CD-RW write speed of just under the nominal 24x. Overall, the CR52-A2 is a fast external burner at a reasonable price.

CD-R/RW/DVD COMBO DRIVES

LG GCC-5241P

RATING 7 Price: $549 Contact: LG Phone: 1800 643 156 Web: www.lge.com.au
✓ Genuine portable ✓ DVD playback and CD burning ✗ Relatively slow

The GCC-5241P is a small, external CD-R/RW/DVD combo drive, about the size of a Sony Walkman. Being so small, it has some compromises, including a hinged lid rather than the more convenient tray-loading mechanism of the large drives. The drive also uses a special USB 2.0 cable that contains some of the interface electronics at the end, which plugs >>>

THE JOURNEY STARTS HERE...

Minitar Wireless LAN Cardbus Adapter

The Minitar Wireless LAN Cardbus Adapter is an IEEE 802.11b high data rate standard compatible PCMCIA card, which fully supports high data rate up to 11Mbps, 5.5Mbps, 2Mbps and 1Mbps Using Direct Sequence spread spectrum technology for immunity to interference, it is easy to install on various devices which has a 32bit CardBus controller interface

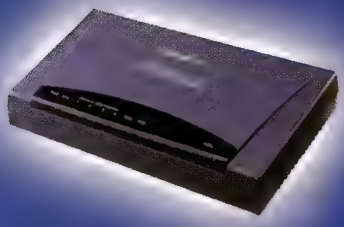
$59

Billion Wireless ADSL Firewall Router

Features include 4 port switch, Wireless Access Point, built in VPN server (PPTP/IPSEC), SPI Firewall, URL Blocking, Port/bandwidth throttling, SNMP & Syslog Control/logging/monitoring, detachable antenna.
Free ADSL Line filter

$299

4 Port ADSL Firewall Router



This 4 Port VPN Firewall Router w/built in ADSL modem comes with a host of features including UPnP support, bandwidth throttling, detects and blocks DoS attacks, URL blocking, packet filtering, SPI. Also supports VPN embedded PPTP client/server, IKE and Ipsec.
Free ADSL Line filter

$249

Minitar Wireless LAN PCI Card

The Minitar Wireless PCI Card is an IEEE 802.11b high data rate standard compatible PCI card, which fully supports high data rate to 11Mbps, 5.5Mbps, 2Mbps and 1Mbps. Automatic fallback to lower data rate optimizes communication possibility in the worst channel conditions and over larger distances.

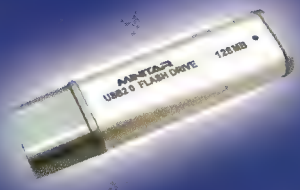
$69

Billion External ADSL Modem/Router

The Billion dual Ethernet/USB ADSL Modem complies with ADSL standards and supports downstream rates of up to 8Mbps (maximum) and up to 1Mbps upstream. It is designed for small office, home office and residential users, enabling high-speed Internet connections. Telstra Certified.
Free ADSL Line filter

$179

USB 2.0 Flash Drive 128MB



The Minitar USB 2.0 Flash Drive is a portable high data rate USB disk. It supports file transfer on MAC or PC platforms. This drive is perfect for those who are always on the move needing a portable storage solution. Available in sizes of 64MB, 128MB & 256MB

$79

PC Range carries a wide range of other products including USB 2.0, PC Modifications, Wireless Gear and Networking Gear.

PCRange
www.pcrange.com.au

www.pcrange.com.au
Call 08-8322-9544
sales@pcrange.com.au

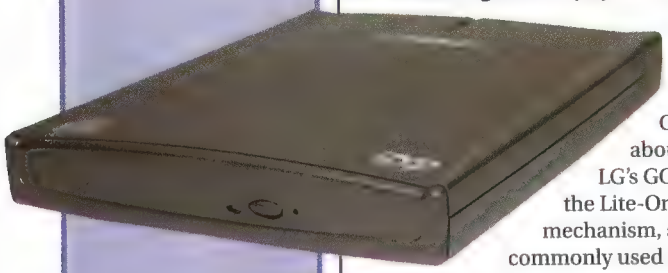
Reseller and Dealer enquiries welcome.

© 2003 PC Range Pty Ltd. All prices are GST inclusive and do not include freight. All Trademarks or trade names are the properties of their respective owners. PC Range is the exclusive distributor of the Billion modem in Australia. Prices and specs subject to change without notice. ABN # 36 101 821 407

into the unit. This minimises the size of the drive and has no adverse effects functionally (the other end of the cable will plug into any PC USB port), but the cable may be expensive and difficult to replace. Speed is the main compromise, with 24x10x24 nominal CD speeds and 8x DVD read speed. It could only manage a CD-R burn average of 16x. At least the average CD-RW write speed matched the nominal 10x speed. It also took the PC a while to recognise a disc after loading — often about 30 seconds — and RAW mode burning isn't supported. It comes with Nero for CD burning and PowerDVD for DVD movie playback. As a travelling storage companion for a notebook PC, the GCC-5241P will do a fair job.

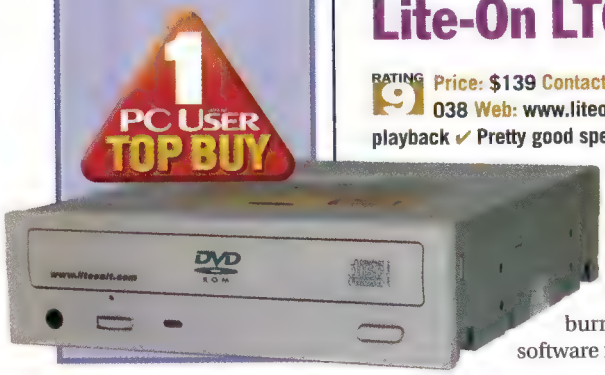
Lite-On LSC-24081MX

RATING 9 **Price: $389 Contact: Synnex Phone: 1300 880 038 Web: www.liteonit.com ✔ Genuine portable ✔ CD burning and DVD playback ✘ Relatively slow**



The LSC-24081MX is another small external combo CD-R/RW/DVD drive, about the same size as LG's GCC-5241P. However, the Lite-On uses a tray-loading mechanism, similar to those commonly used in notebook CD drives, with the motor and head assembly in the tray. It also uses a more conventional USB 2.0 cable. It's stacked with features, including Nero and PowerDVD software, while an audio lead, and blank CD-R and CD-RW discs are included. It supports RAW mode for direct CD copying and Mount Rainier for more convenient handling of rewritable discs with future operating systems. Speed is again compromised, with nominal CD speeds of 24x12x24 and 8x DVD read speed. The average CD-R burn speed of just 16x was similar to the small LG model, but the average CD-RW write speed was slightly higher at just under the nominal 12x. The Lite-On LSC-24081MX has everything you'll need from a CD burner and more. At under $390, it's priced similarly to some external burners without DVD playback.

Lite-On LTC-48161H



RATING 9 **Price: $139 Contact: Synnex Phone: 1300 880 038 Web: www.liteonit.com ✔ CD burning and DVD playback ✔ Pretty good speed ✔ Great price**

This internal tray-loading IDE drive offers CD burning, CD-RW writing, CD reading and DVD playback. It includes Nero burning software, PowerDVD software for playing DVD movies, disc retainers for vertical mounting, an audio cable, but no IDE cable. The drive also supports RAW mode for direct CD copying and Mount Rainier for more convenient handling of rewritable discs with future operating systems. With nominal CD speeds of 48x24x48, there's a small speed compromise compared to the fastest CD burners. But with an average CD-R burn speed of just over 37x, it was certainly not disgraced by the 52x burners. Its 18x average CD-RW write speed wasn't up with the fastest 24x CD-RW writers, but it's better than many. The 16x DVD read speed is as good as it gets. It's a fast, flexible optical storage device and is cheaper than some CD-R/RW drives that lack DVD playback. PCU

EXTERNAL BURNERS: HOW THEY COMPARE

	Price	DVD-ROM	Interface	Nominal speeds*	CD-R test results			CD-RW test results			CD-ROM test results			Speed profiles			RAW Mode	Mount Rainier	Software	
					Start	End	Avg	Start	End	Avg	Start	End	Avg	CD-R	CD-RW	CD-ROM			CD burn	Packet write
4KUS CXR-3X40B	$239	No	USB 2.0	40x24x40	18.77	39.64	31.31	10.88	23.62	18.01	18.1	38.98	29.61		CAV	CAV	No	No	Nero	InCD
BenQ CRW5224WU	TBA	No	USB 2.0	52x24x52	23.49	51.72	39.32	17.33	24.4	23.38	23.04	47.96	36.45	CAV	P-CAV	CAV	Yes	No	Nero	InCD
Imation 40x24x40 External CD-RW Drive	$329	No	USB 2.0	40x24x40	18.83	39.79	31.42	10.92	23.7	18.08	18.15	39.12	29.72	P-CAV	CAV	CAV	Yes	Yes	Nero	InCD
Iomega CD-RW 48x24x48 USB 2.0 Drive	$499	No	USB 2.0	48x24x48	22.13	48.72	37.05	11.23	24.38	18.59	21.28	46.11	35.02	CAV	CAV	CAV	No	No	Iomega HotBurn	Iomega HotBurn
LaCie d2 U&I CD-RW	$349	No	USB 2.0 & FireWire	52x24x52	23.53	49.75	36.64	18.92	23.91	23.46	22.14	49.16	37.31	CAV	P-CAV	CAV	Yes	Yes	Easy CD Creator	DirectCD
LG GCC-5241P	$549	Yes	USB 2.0	24x10x24x8	10.01	24.04	16.45	10.01	10.02	10.01	10.89	24.21	18.38	ZCLV	CLV	CAV	No	No	Nero	InCD
Lite-On LSC-24081MX	$389	Yes	USB 2.0	24x12x24x8	7.98	23.96	16.2	9.98	11.98	11.59	10.65	23.05	17.5	ZCLV	Z-CLV	CAV	Yes	Yes	Nero	InCD
Lite-On LXR-40243A	$259	No	USB 2.0	40x24x40	18.81	39.74	31.39	10.91	23.68	18.06	18.15	39.08	29.69	P-CAV	CAV	CAV	Yes	Yes	Nero	InCD
Mitsubishi Diamond Data D522452UE-158	$259	No	USB 2.0	52x24x52	23.65	51.95	39.54	17.41	24.48	23.46	22.35	48.26	36.66	CAV	P-CAV	CAV	No	No	Nero	InCD
MSI CR52-A2	TBA	No	USB 2.0	52x24x52	23.52	51.83	39.4	20.63	23.93	23.74	22.17	49.12	37.3	CAV	P-CAV	CAV	No	No	Nero	InCD

* Nominal speeds in this order: CD-RxCD-RWxCD-ROMxDVD-ROM

Simply Protect Everything

Backup with Drive Image® 7

Every computer is vulnerable to data loss caused by viruses, faulty software or hard disk failure. Drive Image 7 provides a complete backup solution, saving you hours of frustration. With your operating system, programs and settings as part of one backup file, you can have your computer up and running again in a matter of minutes.

With Drive Image 7 you can:

- *Backup your entire computer without leaving Windows*
- *Save your backup to virtually any media or drive*
- *Safely restore your entire system or just selected files*
- *Schedule automatic backups*

For more information, call 1800 733 003 or visit www.powerquest.com/pcuser.

© 2003 PowerQuest Corporation. PowerQuest products may be protected under U.S and International patent law or pending patents. PowerQuest and Drive Image are registered trademarks of PowerQuest Corporation in the United States and elsewhere.

POWERQUEST

AUDIO TECH TERMS

EQ (Equalisation). There are various forms of EQ, but all are designed to boost or cut the level at specific frequencies. The simplest form of EQ is tone control.

File compression. Most audio file compression uses a lossy scheme, which means it loses some of the data to help get the file size down, like JPG does for images.

Normalise. This looks for the loudest peak in your file and increases the overall volume to be as load as possible, before distortion. This is not the same as compression as it does not alter the inherent dynamics of the song. It just boosts the level.

PQ editing. P and Q are just labels given to the subcode data on a CD that controls where tracks start and end. A good audio CD mastering program will allow you to define these markers freely. They don't necessarily have to be where your song files start and end.

Redbook Audio. Named after the colour of the cover for the book that defines the CD audio standard. This is the basis of all CD formats that followed.

«<<

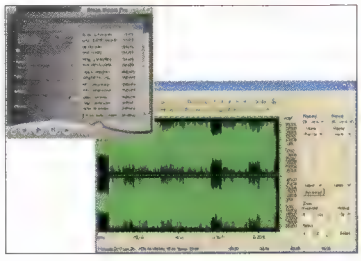
tool. It will burn audio CDs with support for MP3 and WMA files, and there are some basic gap control and cross-fade features. It can also create discs for MP3 CD players. Beyond this standard audio disc support, there is now a dedicated module called Audio Central. This is a media player, complete with CD ripping and eye candy visualisations, which also allows you to burn your playlist to disc. You can edit songs using the provided WAV editor, which offers some decent noise reduction and WAV mangling effects like declick and robotiser. For serious audio restoration or mastering work, you'd want something more powerful, but for the vast majority of people, this is a great all-rounder.

Roxio Easy CD & DVD Creator 6

SHAREWARE BURNERS

Blaze Media Pro 4.10c

RATING 7 **Price: $US50 Web: www.mystikmedia.com ✔ Great audio tools ✔ Video editing ✘ A bit confusing to use**



This shareware tool has a bit of everything, including a media player, music database and CD ripper and burner. It also includes a reasonable WAV file editor, with several good built-in effects. But wait, there's more! It also has video capture and a video editor, which are also reasonably well done. It converts between MP3, WMA, Ogg and others, and extracts audio from video files. It even supports online CD databases, lyrics search and much more. In a way, this program is trying to do too much and it gets a bit confusing. It needs a more integrated and intuitive interface. This aside, Blaze Media Pro is a nice little all-rounder for those willing to persevere with it.

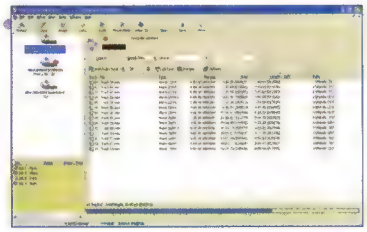
BurnQuick Data/Audio CD Burner 2.12

RATING 7 **Price: $US15 Web: www.burnquick.com ✔ Simple to use ✘ No audio preparation tools**

This shareware tool is a lot simpler, installing as a right-click option in Windows Explorer. Simply select the files you want to burn to disc, right-click and select BurnQuick. A simple interface will appear so that you can choose what kind of disc you want it to be and a few other options, then burn away. You can also burn disc copies, and it supports mixed-mode and CD extra format discs. However, if you are going to try burning these, a full CD-R application makes the process clearer. There's also little in the way of audio preparation tools, but BurnQuick is good for simple backups, copies and compilations.

RecordNow Max 4.5

RATING 8 **Price: $US39 Web: www.stompinc.com ✔ Easy to use ✔ Creates most CD types ✘ Lacks advanced features**

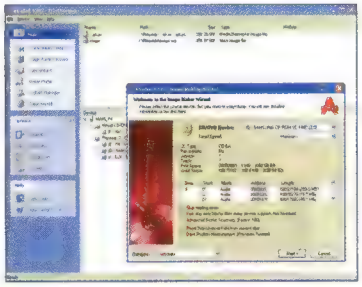


This is the best shareware CD burning tool we have seen for some time. It has a well-designed interface and makes burning CD copies and simple ROM or audio CDs easy, either with the main interface or a wizard. There is support for mixed-mode CDs and VCDs, as well as MP3 audio discs. One neat feature is DJ burn for burning audio CDs from a wide range of source files, or even from a live input like your soundcard's line in. It lacks some of the more advanced formats and features, but this is a great all-rounder for the average user.

CD COPIERS

Alcohol 120% 1.4.3

RATING 9 **Price: $US49.95 Web: www.alcohol-software.com ✔ Copies just about anything ✘ Beware the legalities**



Alcohol 120% does conventional CD-R burning, but its main claim to fame is making direct CD copies. In this regard, it occupies a murky area of the law, particularly with its ability to copy PlayStation discs, VCDs, and discs that use various forms of copy protection, including SafeDisc (1 and 2), SecuROM or LaserLock. However, as long as you use Alcohol for copying your own homemade CDs or making personal backups of software CDs you have legally purchased, then you shouldn't fall foul of the law. You will need a CD-R drive that supports RAW mode or Alcohol won't be able to copy the hidden subcode data >>>

dodo™

1300 666 330

BROADBAND Unlimited

- Fast unlimited internet at a fixed price
- No download limits
- Ability to use telephone while connected
- No dial up and phone call charges
- "Always on" internet connection
- No minimum terms

* FROM **$64.90** per month for 256k/64k connection

www.dodo™.com.au

internet that flies

*This price available in Capital Cities only.
Credit card payment monthly in advance plus one-off $169 connection fee. ADSL Service not available in all areas.

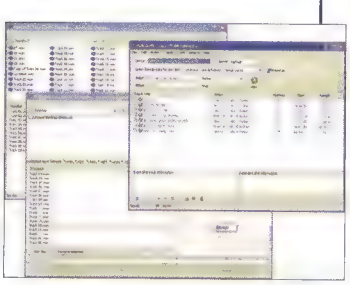
AUDIO TECH TERMS

Resolution. With audio CDs, the data is stored as 16 bit with a sample rate of 44.1 kHz, in stereo. However, for professional audio applications, it is not unusual these days to record files at 24 bit/96Khz, and processing to be done at 32 bit. A resolution of 192kHz is also supported by many programs, but for now, this is just not widely used.

Ripping. Digitally extracting tracks off a CD (or DVD) and converting them to digital audio (or video) files on your hard drive.

VST. This is an audio plug-in standard defined by Steinberg for audio applications. It allows for third-party developers to create effects and even complete applications (using VSTi for instruments) that work with a VST host application like Cubase or WaveLab.

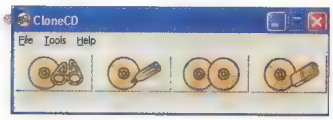
WAV file. The main Windows format for audio files and used by audio file editing software. Can be better than audio CD quality, but file sizes are large, which is why audio formats with compression, such as MP3, were invented.



«<<

that is essential for an exact CD copy. Alcohol 120% is a great piece of software that competes with CD-R tools likes Nero and direct copiers such as CloneCD. It will even read and write image files from the standard ISO format to several proprietary ones. It's a bit more involved than CloneCD, as it is much more versatile and offers greater control, but Alcohol has wizards to help you through the processes.

elby CloneCD 4.2



RATING 8 **Price: E39 Web: www.elby.ch ✓ Easy direct CD copies ✗ Beware the legalities**

CloneCD isn't a true CD recorder, but specialises in making direct copies of existing CDs. Like Alcohol 120%, you'll need a CD-R drive that supports RAW mode and again, you need to be aware of the legal implications of your copying. For some time, CloneCD was the best copying tool around, but things change fast and now CloneCD is losing favour to Alcohol. Nevertheless, it's still a great tool for doing a quick and simple copy of any kind of disc, retaining the copy protection for most of the more popular schemes. — but that's just about all it does.

RIPPERS AND MP3 TOOLS

FreeRIP 2.3

RATING 8 **Price: Free Web: www.mgshareware.com ✓ Free ripper ✗ Banner ads**

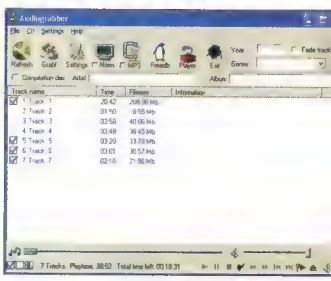
Want to rip tracks from an audio CD? Try this first, because it's free. The price you pay for this is putting up with banner ads. Like most, it uses the FreeDB database for track information and rips to WAV, MP3 and Ogg formats. It will also convert files off the hard disk. If you don't mind the ads, this does everything a simple ripper/encoder needs to do.

AltoMP3 Maker 3.12

RATING 8 **Price: $US19.95 Web: www.yuansoft.com ✓ Very easy to use ✗ Lacks advanced features**

Easy to use and with a funky look, AltoMP3 rips to WAV, MP3 and Ogg. There is a built-in CD player for previews and a FreeDB link for track information. It will also encode and convert files directly off the hard drive. It's very simple in its approach, but has everything you need for straightforward ripping and converting.

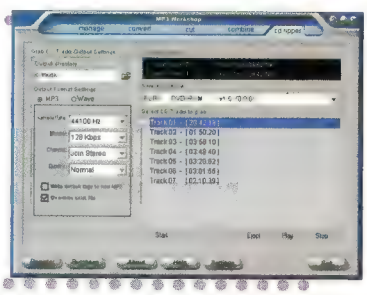
Audiograbber 1.81



RATING 9 **Price: $US20 Web: www.audiograbber.com-us.net ✓ Straightforward ripping and encoding ✗ No extras**

I must admit, this is my favourite CD ripper and encoding tool, even though it may not be the most powerful or versatile around. If you want to rip tracks and save them to hard disk as WAV files, or convert them directly to MP3, WMA or Ogg, it does the job clearly and simply. It has several more useful features and the codecs are built in, plus it supports external codecs. It doesn't come with a player, visualisations, or song catalogue features, but for simple ripping and encoding, it's great.

MP3 Workshop 1.8



RATING 7 **Price: $US19.95 Web: www.audio2x.com ✓ Simple to use ✗ MP3 only**

With this one, you can rip directly to MP3 only (other formats are not supported). There are some simple editing tools for combining or trimming audio files, and a basic file manager is included. The interface is clean and simple, but the program is rather limited otherwise.

Poikosoft Easy CD-DA Extractor 5.1

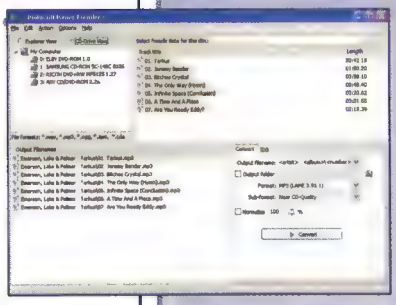
RATING 8 **Price: $US23.45 Web: www.poikosoft.com ✓ Extracts, converts and burns ✗ Separate apps**

This more full-blooded version of Power Encoder (see next review) comes as three separate mini applications:

an extractor, a converter and a CD creator. The extractor will rip and convert to a wide range of formats and includes WMA support. The converter will do this for existing files on your hard drive and the CD Creator does the burning. All work very well, but it's a shame they aren't integrated into one interface.

Poikosoft Power Encoder 1.0

RATING 8 **Price: $US11.95 Web: www.poikosoft.com**
✓ Straightforward ripping and converting
✗ No WMA support

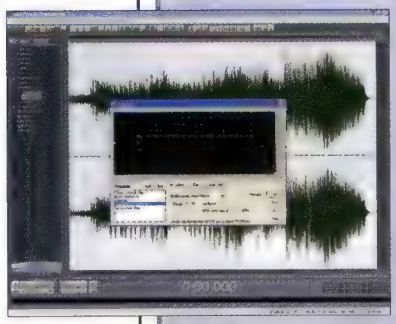


This gives you everything in one easy-to-understand interface. You can rip and convert files to WAV, MP3 (using the Lame codec), Ogg, plus one called Monkey Audio I've never heard of, but no WMA. It uses the FreeDB online database to get track data. That's all it does. But for a straight ripper/converter, this is pretty good.

WAV EDITORS

Cool Edit Pro 2.1

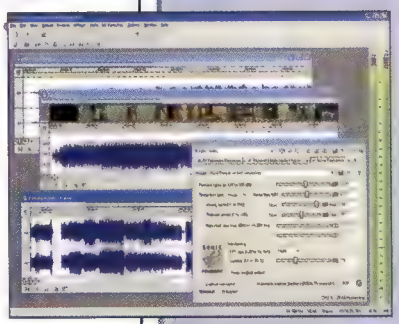
RATING 8 **Price: $US249 Web: www.syntrillium.com**
✓ Includes loop composition and CD mastering
✗ Not as powerful as some



Cool Edit started off as a shareware WAV editor, but the Pro version has evolved to compete head on with Sound Forge and WaveLab. It doesn't have the power and control of those two audio editors, but it has a very comprehensive set of tools. All processing is done in 32 bit and it supports resolutions of up to 24-bit/192kHz, making it suitable for professional use. It has some advanced built-in filters and you can use DirectX plug-in effects. It will also mix for surround sound, and for home studio users, there is MIDI Time Code (MTC) and video file support. It has a multitrack module for loop-based composition (pitching it against ACID Pro) and other complex mixes and can even be used as an audio CD mastering tool (see our tutorial on page 69). For powerful WAV editing, loop composition and mastering under one roof, check out Cool Edit Pro. If you're less demanding, Cool Edit 2000 is one of the best shareware WAV editors.

Sonic Foundry Sound Forge 6

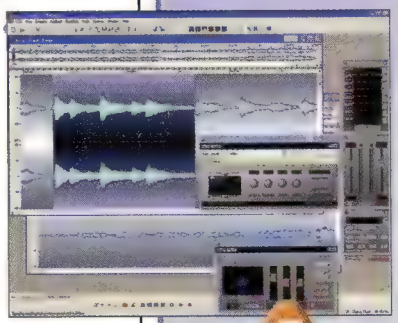
RATING 9 **Price: $599 Contact: New Magic Phone: (02) 9528 4555 Web: www.sonicfoundry.com ✓ Comprehensive editor ✓ Supports ACID ✗ No multitrack support**



Sound Forge comes with heaps of built-in processing tools, filters and effects, and supports DirectX plug-ins. Multiple effects can be applied in real time using the plug-in chainer. There is support for ACID loops (another Sonic Foundry product) and it will also load digital videoclips for soundtrack editing. CD burning is only with Track At Once (TAO) and is not suitable for audio CD mastering, despite the inclusion of Wave Hammer Mastering tools. For this, you need Sonic Foundry's CD Architect (see review on page 54). This is not a multitrack digital audio editor, so you'll need ACID or Sonic Foundry's Vegas instead, but for comprehensive editing of individual WAV files, samples and loops, or video soundtracks, it is superb.

Steinberg WaveLab 4

RATING 9 **Price: $1,199 Contact: MusicLink Phone: (03) 9765 6565 Web: www.steinberg.net ✓ Powerful editor ✓ Audio CD mastering ✗ Can't edit video soundtracks**



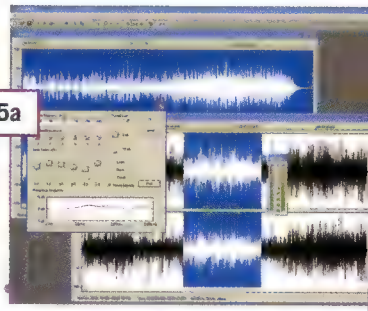
WaveLab is probably no better than Sound Forge as an actual WAV editor, but when you throw in its Audio Montage feature for audio CD mastering, it's a compelling buy for serious users. We've covered the Audio Montage feature on page 54, but the WaveLab audio editor has heaps of effects and sound altering features, plus advanced tools for inverting phase, time and pitch shifting, resampling, and a number of unique ways to view and analyse the audio data. Using the Master Section, you can apply real-time VST and DirectX audio plug-ins, and some excellent effects are included. Other advanced features include MIDI time code support and sample editing for a wide range of professional samplers. ASIO and WDM drivers are supported. The only thing missing is support for video files.

SHAREWARE WAV EDITORS

Acoustica 2.25a

RATING 8 **Price: $US15 Web: www.aconas.com ✓ Good effects ✓ Good basic controls ✗ No plug-in support**

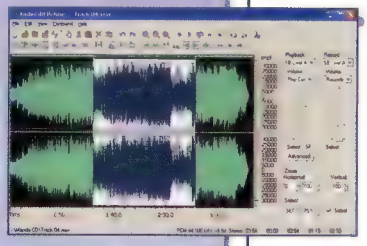
This shareware WAV editor is pretty good, despite its ugly colour scheme. Effects are destructive (so save your files in another name first!), but at least you can preview them before committing, and there are >>>



Acoustica 2.25a

«<

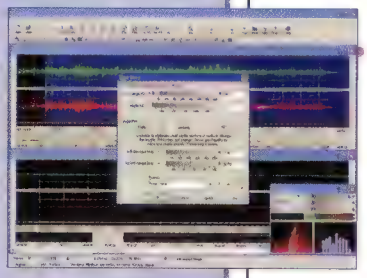
decent graphic controls for them. There is also some basic noise-reduction filtering included. There are even some useful analysis tools. There's no plug-in or 24-bit support, or any of those other high-end features. But for a basic WAV editor, this is not bad, especially for the price.



AudioEdit Deluxe 2.1c

RATING 6 **Price: $US40 Web: www.mystikmedia .com ✔ Decent range of effects ✔ CD ripper ✘ Crude controls**

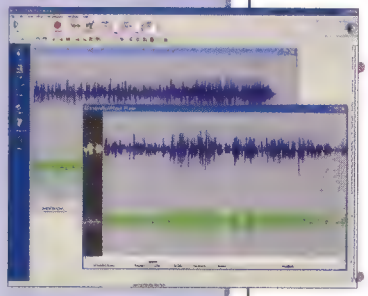
Another reasonably good audio editor for its price, Audio Editor has a decent range of effects, but they offer very crude controls and are all destructive (there's no real-time preview here). There is no support for DirectX plug-ins either. It also functions as a CD ripper and converter and does this reasonably well. As long as you only want to do simple stuff, this will serve fine.



GoldWave 5.04

RATING 8 **Price: $CA55 Web: www.goldwave.com ✔ DirectX support ✘ Not for professionals**

This has been one of the best shareware WAV editors around for some time, and this version adds some very cool new features, such as DirectX plug-in support and its own internal clipboard. It has heaps of good built-in filters, some decent audio restoration tools for cleaning up vinyl or cassette tape recordings, and a unique expression generator for mathematically creating your own sounds. The interface is now more consistent with Windows and audio software conventions. While it does support 24-bit/192kHz resolution, this is not a professional tool, but it's a good choice for the experienced amateur.

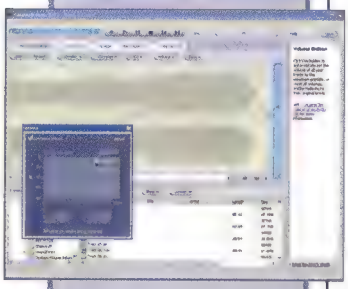


Wave Flow 4.9

RATING 6 **Price: $US25 Web: http://sagat.hypermart .net/ ✔ Simple to use ✘ No plug-in support**

The cheesy interface here does not bode well, but the range of filters is decent and they offer reasonable controls. There is no real-time preview or operation, and certainly no plug-in support. There are better and more versatile shareware tools around, but Wave Flow is a simple program that does the basic stuff well enough.

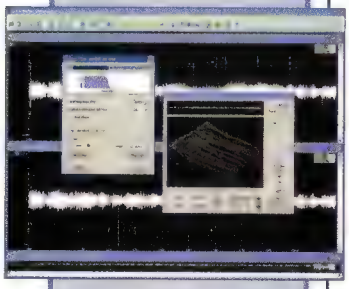
AUDIO RESTORATION AND MASTERING



Cakewalk Pyro 2003

RATING 8 **Price: $99 Contact: Intelliware Phone: (08) 8277 1722 Web: www.cakewalk.com ✔ Good filters and mastering features ✘ No dynamic compressor**

Here's a good all-round audio tool for the average audio enthusiast. Files can be edited with declicking and denoise filters, and you can then apply some EQ and adjust the volume. The program offers a great timeline for track visual layout, but there's no dynamic compressor. You can convert to MP3 or WMA and upload songs directly to a portable player, or burn an audio or data disc. There are some good mastering features for audio CD burning, but no mastering effects. For simple audio restoration and create custom audio discs, Pyro works a treat. It's easy to use and gets quick results.



DART XP Pro

RATING 7 **Price: $US199.95 Web: www.dartech.com ✔ Good restoration tools ✔ DirectX plug-in support ✘ Limited mastering tools**

With DART XP Pro, you can apply a number of noise reduction and declicking tools to clean up recordings and even removing or reduce vocals in a song. The two views give you a constant comparison between the original and processed versions of a song. DirectX plug-ins are supported, but not in real time. As a WAV editor or CD mastering tool, it is limited, but its restoration tools work well. Despite its recent update, DART is not keeping up with the competition, but it's worth a look if you're serious about audio restoration.

Diamond Cut FIVE

RATING 9 **Price: $449 Contact: Multimedia Music Phone: (03) 9587 6910 Web: www.multimedia-music.com ✔ Powerful restoration tools ✘ Lacks high-end mastering features**

This is another dedicated audio restoration tool, but this release also offers some good general WAV editing features with things like compression and several forms of EQ, plus cool filters like the virtual valve amplifier. On the restoration side, you can use a range of EZ filters or the multifilter to chain several together. There are so many specialised filters to choose from here that it can clean up just about any kind of noise or audio >>>

P4 Titan Series 1100/1000 Family

- Dual Channel DDR 400 support
- 800MHz system bus support
- AGP 8X
- Performance Acceleration Technology (PAT) (875P Chipset Series Only)
- Serial ATA

Born to be Fast!

The DNA of GIGABYTE P4 Titan Series

Intel® 875P/865PE/865G chipset based motherboard

Are you ready for Hyper-Threading Technology?

P4 Titan™ series

GA-8KNXP Intel® 875P/ ICH5R Chipset

- Supports 800MHz FSB Pentium® 4 Processor with HT Technology
- New generation Dual Channel DDR400 architecture support
- AGP 8X with AGP Pro interface for excellent graphics performance
- Gigabyte patented Dual Power System 2 (DPS 2) design
- Integrated Serial-ATA interface
- Integrated T.I. IEEE1394 interface
- Integrated GigaRAID IDE RAID interface
- Integrated Intel® PRO/1000 CT Network Connection
- Features Performance Acceleration Technology (PAT)

FSB 800 | Serial ATA | IEEE 1394 | ATA133 RAID | Intel® PRO | USB 2.0 | DualBIOS™ | 6-Channel Audio | Xpress™ | Ant Burn™ | EasyTune™ 4 | Q-Flash™ | @BIOS™ | Multi-Lang BIOS

P4 Titan™ series

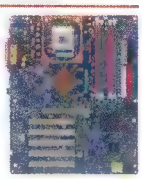
GA-8PENXP Intel® 865PE/ ICH5 Chipset

- Supports 800MHz FSB Pentium® 4 Processor with HT Technology
- New generation Dual Channel DDR400 architecture
- AGP 8X with AGP Pro interface for excellent graphics performance
- Gigabyte patented technology Dual Power System 2 (DPS2) design
- Integrated Serial-ATA Interface
- Integrated Intel® PRO/1000 CT Network Connection
- Integrated IEEE 1394 Firewire interface
- Integrated GigaRAID IDE RAID Interface

FSB 800 | Serial ATA | IEEE 1394 | ATA133 RAID | Intel® PRO | USB 2.0 | DualBIOS™ | 6-Channel Audio | Xpress™ | Ant Burn™ | EasyTune™ 4 | Q-Flash™ | @BIOS™ | Multi Lang BIOS

P4 Titan™ series

GA-8IPE1000 Intel® 865PE/ICH5 Chipset



- Supports 800MHz FSB Pentium® 4 Processor with HT Technology
- New generation Dual Channel DDR400 architecture
- Integrated Serial-ATA interface
- Supports AGP 8X interface for higher graphics performance
- Provides 8 USB 2.0 ports for high-speed connectivity
- Integrated high quality 6-channel AC'97 audio with Jack-Sensing

FSB 800 | Serial ATA | USB 2.0 | 6-Channel Audio | Xpress | Anti Burn™ | EasyTune™ 4 | Q-Flash™ | @BIOS™

* These speed settings are not guaranteed by GIGABYTE
-- The specification and pictures are subject to change without notice
All trademarks and logos are the properties of their respective holders
-- Any overclocking is at user's risk. Giga-Byte Technology shall not be responsible for any damage or instability to your processor, motherboard or any other components

For more information, please call our distributors:

Australia

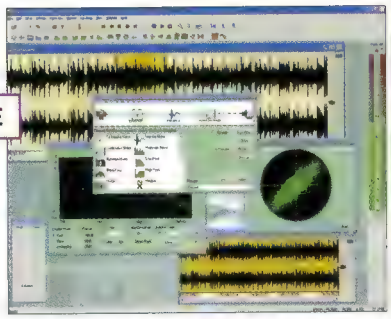
N.S.W.	HALLMARK	02-9748-8811	VICTORIA	HALLMARK	03-9540-8555	QUEENSLAND	SYNNEX 07 3847 8300
	GLOBAL	02-9644 3900		SYNNEX	1300-880-038	PERTH	SYNNEX 08-9204 5700
	SYNNEX	02-9748-9800			(TOLL FREE)		HALLMARK 08-9477-5440
	RECTRON	02 9748 7725		RECTRON	03 9561 6166	ADELAIDE	HALLMARK 08-8340-3740
						DARWIN	HALLMARK 08-8981 9111

New Zealand

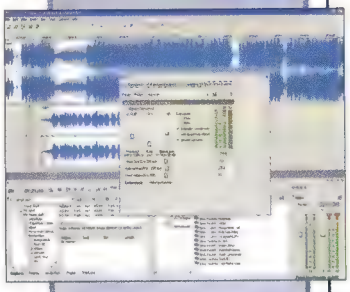
Black Diamond Technology Limited
64-4-560-9100
Checksun New Zealand Limited
64-9-579 8832

Upgrade Your Life™ www.gigabyte.com.tw

GIGABYTE TECHNOLOGY


Diamond Cut FIVE

corruption. These can be previewed nondestructively before applying. You can also apply a series of filters to a batch process on multiple files. It supports sample rates up to 192kHz and has WDM driver support for your soundcard. There is no plug-in support. If you are serious about audio restoration from any source, this is a great tool. It's not bad as a regular WAV editor and mastering tool either.



Sonic Foundry CD Architect 6

RATING 9 **Price: $319 Contact: New Magic Phone: (02) 9528 4555 Web: www.sonicfoundry.com ✓ Advanced mastering effects ✓ Supports DirectX plug-ins ✗ Requires a WAV editor**

This is a dedicated audio CD mastering tool, so you'll need a WAV editor for preparing your source WAV files. You can lay out your tracks, apply mastering-quality effects, control PQ codes (track indexes), preview how it will sound, then burn an audio disc suitable as a master for CD replication. DirectX audio plug-ins are supported and over 20 master-quality effects are included. Effects can be applied to each segment individually, as well as to the master output for overall changes. It has everything a serious home studio musician/producer could need for mastering discs.

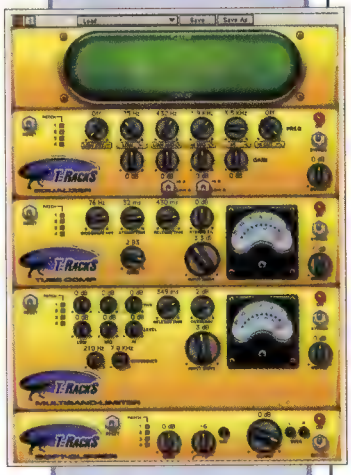
Steinberg Clean 4.0

RATING 9 **Price: $199 ($299 for Plus edition) Contact: MusicLink Phone: (03) 9765 6565 Web: www.steinberg.net ✓ Easy mastering and audio restoration ✓ VST plug-in support ✗ No track timeline**

Clean's restoration tools clean up clicks, crackle, tape hiss and other specific noise types. There is a graphic EQ and filters like Sound Morph and Brilliance and two empty effect slots to load any VST plug-in into. Finally comes mastering with Dynamic Compression and other fine-tune controls, plus a section to add simulated prologic surround sound to stereo files. There's no timeline to more easily lay out tracks and edit PQ markers. The Plus edition includes a pre-amp unit to connect your turntable to your soundcard's line in. Clean would suit musos creating demo discs, and is ideal for converting vinyl or tape to CD.

WAVELAB'S AUDIO MONTAGE

Steinberg WaveLab is a very comprehensive WAV editor (see review on page 51). It also comes with a section called Audio Montage, which is a multitrack mixer and CD mastering tool. Like the rest of WaveLab, this supports real-time (nondestructive) VST and DirectX audio plug-ins, with some high-quality effects and restoration filters included. Multiple real-time effects can be applied, and these can be added to each song individually or to the entire mix via the program's Master section. Automatic cross-fades are easily created, volume and pan can be automated with envelope controls, and PQ editing is easily done with markers for start and end points. Unfortunately, effects applied in the Master section are not saved as part of a Montage mix, but aside from this, it does anything else you could possibly want in a software mastering tool.

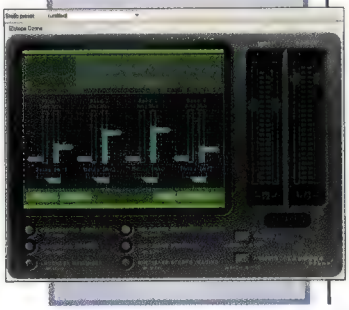


MASTERING PLUG-INS

IK Multimedia T-RackS Plug-in

RATING 9 **Price: $699 Contact: Sound and Music Promotions Phone: (03) 9528 5744 Web: www.ikmultimedia.com ✓ Modelled on high-end mastering hardware ✗ Not for novices**

T-RackS used to be a standalone application, but this version is an audio plug-in suite and comes in DirectX or VST format. These audio plug-ins are designed for audio CD mastering by serious users. They work inside your WAV editor or music composition application, and can be used to complement the effects provided by your mastering software. T-RackS gives you analog-quality mastering and most of what you'll need in one integrated interface, with 32-bit floating-point processing. There is a six-band stereo parametric equaliser, a 'Tube' compressor, a multiband stereo limiter, and a soft clipper. Each processor can be used in a rack or as standalone effects. All these processors have been modelled on high-end analog mastering gear, and sound superb. However, it lacks an aural exciter and stereo imaging tools. This is meant for experienced mastering engineers who want to try a software-based solution.



iZotope Ozone 2.0

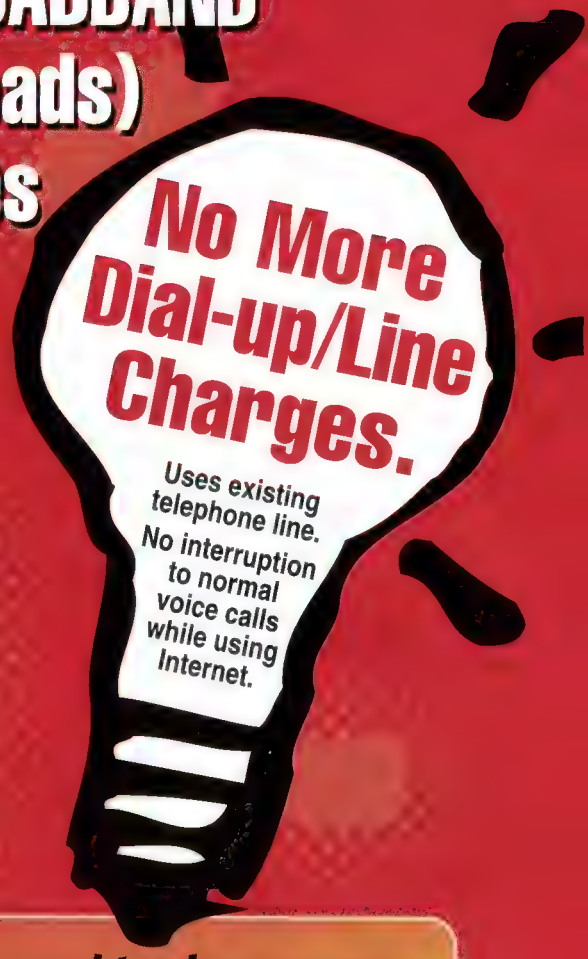
RATING 9 **Price: $US199 Web: www.izotope.com ✓ Adds mastering effects to compatible editors ✓ Emulates value sound**

Ozone packs many useful effects into one integrated interface, with a Paragraphic EQ, Reverb, Loudness Maximiser, Multiband Harmonic Exciter, Multiband Dynamics, and Multiband Stereo Imaging. Processing is done at 64 bit and you can chain the effects for a complete mastering solution. They emulate analog and valve units for a warm, professional sound. iZotope Ozone works well and, more importantly, sounds great. For an affordable solution to mastering music on the PC, it's a great choice. PCU

Playing to win?

HOME 512K/128K 24x7 BROADBAND Internet (6GB/14GB downloads) & unlimited Netspace games server access

from $69.95 p/m



High speed, high volume ADSL HOME Internet access/usage plans that INCLUDE huge monthly transfers:

- LITE 256/64 $49.95 (1GB DOWNLOAD P/M)
- HOME 512/128 $69.95 (6GB DOWNLOAD P/M)
- HOME 512/128 $99.95 (14GB DOWNLOAD P/M)
- HOME 1500/256 $149.95 (18GB DOWNLOAD P/M)

ALL Netspace HOME Plans include:

- OPTIONAL FLAT RATE PLANS AVAILABLE. PREVENTS EXCESS MONTHLY DOWNLOAD USAGE AND CHARGES OVERRUNS.
- FREE UNLIMITED DOWNLOADS & UPLOADS BETWEEN NETSPACE SAME-STATE HOME ADSL CUSTOMERS
- FREE UNLIMITED ACCESS TO NETSPACE GAMES SERVERS
- FREE UNLIMITED UPLOADS. FREE TRAFFIC AREAS AVAILABLE
- 10MB FAMILY WEB PAGE. 7DAY HELP DESK
- 56KB MODEM ACCOUNT FOR REMOTE INTERNET ACCESS
- FULL WINDOWS 98+/XP/MAC OS9+ SUPPORT
- ETHERNET PLANS/MODEMS ALSO AVAILABLE
- OPTIONAL 6, 12 & 18 MONTH CONTRACTS WITH VARIABLE ONE-OFF SET-UP FEES.

No need to change your telephone company to get these super broadband prices and transfers.

Netspace ADSL available metro and regional areas, Australia-wide, where ADSL-enabled standard telephone lines apply. Monthly download limits based on peak and off-peak times. Terms & conditions apply.

10 YEARS SERVICE

AUSTRALIAN-OPERATED

PC PowerPlay GOLD AWARD

PC MAGAZINE EDITORS' CHOICE

Editor's Choice apcmag

Netspace

plug.yourself.in

http://www.netspace.net.au
e-mail: info@netspace.net.au

1300 662 991

NET 6155

Make and mix your own music

Want to record and produce your own digital music? Philip Moore reviews many of the different software tools available.

ON THE CD

You'll find most of the shareware programs reviewed here on this month's cover CDs.

TECH TERMS

ASIO (Audio System In/Out). A driver standard devised by Steinberg to improve on the Windows multimedia drivers. It provides better connectivity for audio applications and much lower latencies.

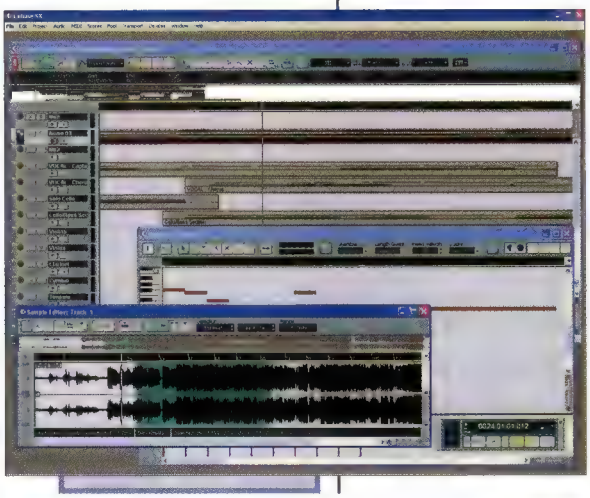
Music and audio on the PC has come a long way. It all began with MIDI. The Music Instrument Digital Interface was a protocol designed to allow synthesisers to communicate with one another, but it didn't take long to realise that a computer could work as a MIDI data recorder. This led to a boom in MIDI-based, multitrack production tools and is the backbone of almost all music creation software. Over the years, as computers got faster and operating systems got smarter, mixing MIDI and audio tracks became possible and is now commonplace.

Around this core of music, composition/production software has built up a vast range of complementary tools and applications, which you will see in the following pages. But first, you need to decide which production tool is best for you.

Cakewalk SONAR XL 2

RATING 9 **Price:** XL, $995; Standard, $795
Contact: Intelliware **Phone:** (08) 8277 1722
Web: www.cakewalk.com ✔ Unlimited MIDI and audio tracks ✔ Excellent soft synths and effects ✘ Steep learning curve

This offers a great music production package for serious amateur musicians or audio professionals on a budget. It supports 24-bit/96kHz recording, and offers unlimited MIDI and audio tracks, plus AVI video support so you can compose a soundtrack. Multiple audio effects can be applied in real time and there are heaps of professional features for timing and sync, metering, as well as ReWire 2.0 support for those using products like Reason or ReBirth. Aside from the core application, you get several excellent DXi soft synths and DirectX audio effects such as the DreamStation synth and ReValver for guitar effects. There is also built-in support to use and create ACID sample loops. It works best with a soundcard that offers WDM or ASIO driver support (with the 2.2 update) for low latency recording and playback. You need a good-quality soundcard to make the most of SONAR, but it will work with just about anything. If the XL version is too ambitious for you, there is a standard version of SONAR (which lacks some of the extras) and Cakewalk Home Studio XL ($395), which is a good entry-level suite for beginners.



Steinberg Cubase SX

RATING 9 **Price:** $1,599
Contact: MusicLink
Phone: (03) 9765 6565
Web: www.steinberg.net
✔ Supports 32-bit recording ✔ Supports 5.1 and video soundtrack mixes ✘ Expensive

Cubase is the established king of serious amateur studio recording software. It can be used for recording and mixing MIDI and audio tracks, supports up to 32-bit/96kHz recording, and supports 5.1 surround sound mixes and video files for composing a soundtrack. Several great VST effects and soft synths are included, and ReWire 2 support is included for even more. The program offers a unique way to network several computers together using ASIO-compatible soundcards alone, and is designed to work best with an ASIO 2.2-compatible soundcard. There's not a lot missing from this powerful all-round music production tool. For those seeking something easier to start out with, Steinberg also offers Cubase SL (no surround sound and other advanced features) or Cubasis for entry-level users.

SHAREWARE MIDI TOOLS

Orion Pro/Platinum 3

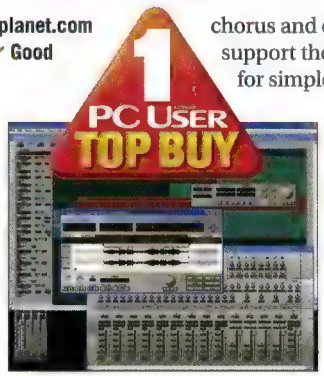
RATING 7 Price: Pro, $US99; Platinum, $US199 Web: www.synapse-audio.com ✔ Great for loop-based composition ✘ MIDI only

Orion is a MIDI composition tool. It imports audio tracks, but you get no audio edit or record functions. It's best suited to techno/trance/dance/hip-hop styles for creating instrumental or backing tracks.

It comes with dozens of different internal sound generators. You can also use VSTi and DXi plug-in instruments, and ReWire instruments. A number of effects are built in and more can be added using VST and DX plug-ins. The timeline is pattern-based. This includes a piano roll editor, but it works like a loop composer. For working up a groove or backing sequence, Orion is useful, but you can't easily render the mixdown to an audio file for further work in another program. One for the tech heads.

Quartz AudioMaster Freeware 4.6

RATING 9 Price: Free Web: www.digitalsoundplanet.com ✔ Multiple MIDI and audio tracks ✔ Good mixer ✘ No piano-roll MIDI editor



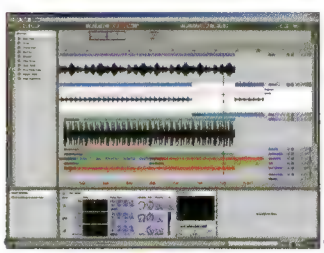
This is the best freeware/shareware music production program we have ever seen. It supports multiple MIDI and audio tracks and provides a good mixer with volume, pan, solo and mute controls. MIDI tracks have parameters for reverb and chorus and audio tracks offer two auxiliary buses for built-in phase, reverb, chorus and delay effects. There is no DirectX or VST support though. A basic WAV editor is included for simple trimming, and a Cubase-like right-click tools palette for use in the main window. There is even a basic Score view. It lacks the advanced features of a commercial tool, but the only essential thing missing is a piano roll MIDI editor. Quartz AudioMaster will give you an excellent start to understanding music software. It's so good, we've given it a Top Buy award — and you don't even have to buy it!

LOOP MUSIC TOOLS

Loop-based tools are similar to music production programs like Cakewalk SONAR and Steinberg Cubase, but they are based primarily on audio samples that can be looped and pitch and time shifted to build up a composition using several repeating sections. Anything that relies on prerecorded samples as its raw material, rather than a straight musical performance, fits in here.

Ableton Live 2

RATING 8 Price: $799 Contact: Major Music Wholesale Phone: (02) 9545 3540 Web: www.ableton.com ✔ Great sequencer for live shows ✘ Pricey



You can use this program much as you would ACID, loading WAV samples into tracks and building a composition, with pitch and beat automatically taken care of and real-time effects applied. Any of these features can be altered in real time as you play back the piece. You can also control things via a MIDI controller or from the computer keyboard, and record this as a performance. Ableton Live bridges the gap between the studio musician and live performer.

Cakewalk Plasma

RATING 9 Price: $109 Contact: Intelliware Phone: (08) 8277 1722 Web: www.cakewalk.com ✔ Has many of SONAR's features ✔ File browser ✔ Great price

This looks and works just like SONAR. It supports MIDI and audio tracks, including regular unlooped content. It can also compose to an AVI video file, and comes with the DreamStation DXi soft synth and several other plug-in tools. DirectX effects and WDM drivers are also supported. This is great value if you're into loop-based composition. >>>

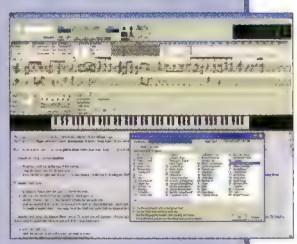
PLAY IT AGAIN

SHAREWARE MIDI TOOLS

Anvil Studio

RATING 8 Price: Free Web: www.anvilstudio.com ✔ Free MIDI recording and notation ✘ No audio file support

This is a MIDI-only multitrack recorder and notation program. It has the bare essentials covered and could be useful as a learning aid if you're just starting out with computer music. It has no print function, but as a cheap way to learn the basic principles of MIDI recording, and notation it's not bad.



TECH TERMS

MIDI (Music Instrument Digital Interface). Standard designed to interconnect synthesisers, and has become widely used on PC soundcards, too. Unlike digital audio files, a MIDI file does not store actual sound data. It records data about the sound — when a note is pressed, how hard it is pressed and so on — but not the sound itself. To get a MIDI file to make sound, this data must be conveyed to a MIDI synthesiser, such as the synth on your PC's soundcard, which interprets and plays the sound.

PLAY IT AGAIN

TECH TERMS

Patch. In broad terms, an instrument definition for a digital synthesiser. In any wavetable or sample-based synth, this is a collection of individual samples that cover the full range of the piano keyboard.

ReWire. This is a connectivity standard designed by Propellerhead Software. It is a virtual audio cable to interconnect soft synths and other music applications.

Native Instruments TRAKTOR DJ Studio 2

RATING 8 **Price:** $449 **Contact:** Major Music Wholesale **Phone:** (02) 9545 3540 **Web:** www.nativeinstruments.com ✔ For performing DJs ✔ Supports MIDI ✘ Not for serious musos

Unlike other loop-based tools, TRAKTOR's interface is more like the traditional 'two turntables and a microphone' setup a performing DJ would be used to. The decks are sample players offering control over pitch and tempo, loop points, synchronisation and scratching. You can use MP3 or WAV files or regular audio CDs played in a pair of CD-ROM drives. The interface is very modular and offers remote control via a MIDI keyboard. For serious DJs, TRAKTOR could be an invaluable addition to your setup.

Sonic Foundry ACID Pro 4

RATING 9 **Price:** $599 **Contact:** New Magic **Phone:** (02) 9528 4555 **Web:** www.sonicfoundry.com ✔ Mixes audio and MIDI ✔ Supports DirectX plug-ins ✘ Doesn't support DXi plug-ins

Although essentially an audio tool, ACID has good MIDI support. Real-time DirectX plug-in effects can be applied and there is effect automation using envelope controls. VSTi soft instruments can be added, but not DXi or VST plug-ins. ASIO and WDM drivers are supported. There's support for video files, so you can compose a soundtrack to images, along with 5.1 surround mixing. If you are serious about loop and sample-based music, this is the leader.

LOOP COLLECTIONS

Cakewalk Loop Libraries

9 **Price:** $119 **Contact:** Intelliware **Phone:** (08) 8277 1722 **Web:** www.cakewalk.com ✔ Supported by Sonic Foundry and Cakewalk tools ✔ Well priced

An easy way to get a good range of loops or sound samples to suit your style is to buy a loop collection. There are a dozen different collections in the Cakewalk range — drum loops, pop/rock/funk rhythms, authentic country sounds, a range of sound effects and atmospheres, techno and house sounds just to mention a few. If working with loops is your thing, these affordable packages can give you a great start.

Sonic Foundry Loops for ACID

9 **Price:** $109 **Contact:** New Magic **Phone:** (02) 9528 4555 **Web:** www.sonicfoundry.com ✔ Great range ✔ Well priced

The maker of ACID Pro also publishes a huge range of loops, professionally performed and produced, and ready to use.

SOFT SYNTHS

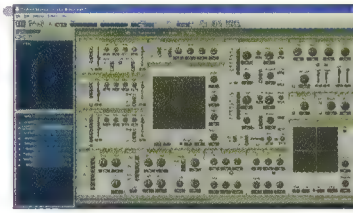
Soft synths range from a simple wavetable synthesiser to a high-end tool modelled on an analog synth to give you freedom to create new sounds, or even be a sampler. Most are VST or DirectX plug-ins for your production/composition software, but some can stand alone.

Cakewalk Project5

RATING 9 **Price:** $795 **Contact:** Intelliware **Phone:** (08) 8277 1722 **Web:** www.cakewalk.com ✔ Comprehensive synth tool ✔ Capable of full compositions ✔ Supports VST and DirectX plug-ins

Cakewalk Project5 is a complete software synth workstation. It works as a standalone application and could be used by itself to produce a complete song from scratch. It also works as a plug-in via the ReWire standard. It has its own internal sequencer, multiple soft synths and samplers, audio and MIDI effects, and ACID-compatible looping tools. It can also be used as a live performance tool. It supports VST and DirectX plug-in effects and instruments, as well as ASIO and WDM drivers. Soft synths include an analog modelling synth, a powerful digital sampler, a dedicated drum sampler, and more. This is a serious music production tool.

Native Instruments REAKTOR 4 & REAKTOR Session 4



RATING 9 **Price:** REAKTOR, $1,399; Session, $599 **Contact:** Major Music Wholesale **Phone:** (02) 9545 3540 **Web:** www.nativeinstruments.com ✔ Incredible synth control ✔ Built-in sequencer ✘ Pricey

This can function as a soft synth, sampler, sequencer, effects unit or a loop-based performance tool. Several ready-made synths are provided, and thousands more instruments are available on the Web site. The full version of REAKTOR lets you create your own modules from scratch. It plugs into a host program via VSTi or DXi, and supports ASIO drivers. For unique, original sounds, this is a must-have. >>>

(it's not a hard drive)

IT'S YOUR 250 GB PORTFOLIO

IT'S THE ONE WITH THE BUTTON
The Maxtor OneTouch™ Drive
Maxtor Personal Storage™ 5000 XT

That's not just data. Those are your best ideas. Maxtor OneTouch™ drive helps you protect them.
Now—with the touch of a button—backing up your projects is easier than ever. So you can store them. Keep them organized. Give them room to grow. And visit them often. It's personal.

For offers and demo: www.MaxtorOneTouch.com/ca

Available from Dick Smith Powerhouse stores, Harris Technology and other leading retailers.

Maxtor®

What drives you?™

© Maxtor Corporation (2002). Maxtor is a registered trademark and Maxtor Personal Storage, Maxtor OneTouch, and What drives you? are trademarks of Maxtor Corporation. All other trademarks are the property of their respective owners. GB means 1 billion bytes. Total accessible capacity varies depending on operating environment. Maxtor OneTouch is an approximate part of your overall data protection plan.

PLAY IT AGAIN

Propellerhead Reason 2.5

RATING 9 **Price:** $999 **Contact:** MusicLink **Phone:** (03) 9765 6565
Web: www.propellerheads.se ✔ Production, soft synth and effects in one ✘ Complex

Reason is the top-of-the-range music tool from Propellerhead Software. It is a complete audio production, soft synth and effects processing package presented as a monster virtual rack. It comes with up to 23 separate modules of one sort or another, plus a sequencer for recording musical passages or entire compositions. Modules include several different forms of synth from granular to sampler and drums, plus a wide range of effects units from delay and reverb to new distortion and vocoder sections. A mixer is provided to pull it all together. You can run Reason as a standalone or as a ReWire plug-in to Cubase or SONAR. This is overwhelmingly powerful stuff and highly recommended if you're into making and mangling original sounds for modern music.

TECH TERMS

RTAS. This is the plug-in standard used by DigiDesign Pro Tools.
Sample. A snippet of recorded sound, generally just a few seconds long, which can be looped for continuous playback. It can also represent the individual instrument notes that make up a 'patch' in a wavetable synth or sampler.
Sequencer. A program that brings together various digital musical elements to form a song.
Softsynths. These are sound generators that rely on your soundcard to reproduce their sound, but their core functionality is entirely software-based.

SampleTank

RATING 8 **Price:** $599 **Contact:** Major Music Wholesale **Phone:** (02) 9545 3540
Web: www.sampletank.com ✔ Easy to use ✔ Hundreds of sounds provided ✘ VST plug-in only

This is a VST plug-in, so it won't work with production tools that only have DirectX plug-in support. It also supports ASIO drivers, but not WDM. SampleTank is a sample-based digital synth, with hundreds of instrument sounds provided. There are 14 categories of instruments including Bass and Guitars, Brass, Drums and Percussion, Strings, Synth, Voice and Loops. You can alter tuning, touch sensitivity, volume levels or other parameters, plus there is a four-band EQ compressor and three effect sends with reverbs, modulations, flange, chorus and rhythmic filters provided. As a sample-based synth, you don't get the sheer versatility of an analog modelled synth, but the range of control here is still pretty good. Ideal for Cubase users who want an easy-to-use soft sample player.

SOFT SYNTHS

Native Instruments VOKATOR

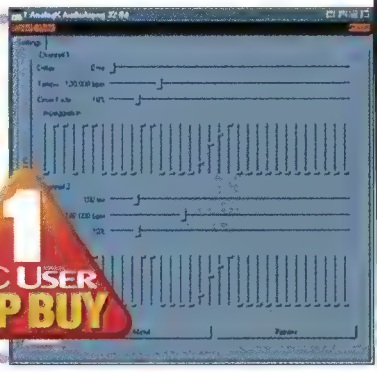
9 **Price:** $699 **Contact:** Major Music Wholesale **Phone:** (02) 9545 3540 **Web:** www.nativeinstruments.com ✔ Cool vocal effect 100 Can also synthesise ✔ Programmable sequencer

A vocoder is an effect that gives your voice a robotic sound, but it does much more. It will process from a live input, or a file or self-generated sound. This last option makes it a synthesiser/resampler, and it produced some cool analog synth noises, with great visual controls and an onscreen keyboard to preview sounds. Other features include a programmable sequencer, powerful mixing options, and a compressor for the final output.

DX & VST PLUG-INS

Steinberg started it all with its VST plug-in standard. Microsoft responded with DirectX (DX) plug-ins. Now there are hundreds of plug-in effects available, and the following is just a small sample. As plug-ins, these effects are designed to be used with compatible music production/composition software.

AnalogX Collection



RATING 10 **Price:** Free **Web:** www.analogx.com
✔ Huge range of effects ✔ Free

This company provides heaps of free plug-in effects, such as the Audio Arpeggiator for creating arpeggio sequences from a single audio file, and a vocal remover to strip a vocal line from a stereo file. It also offers some useful utilities such as DXMan, a manager for all your DirectX plug-ins, and SampleSide to help ensure accurate timing of all your plug-ins. And the best thing is they're all free and on this month's cover CD.

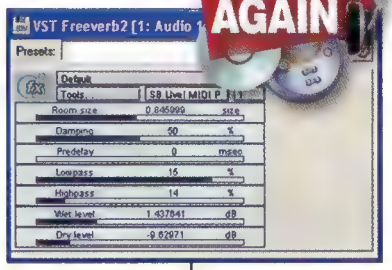
1 PC USER TOP BUY

Arboretum Ray Gun, Ionizer & Restoration-NR

RATING 9 **Price:** Ray Gun, $US119; Ionizer, $US499; Restoration-NR, $US199
Web: www.arboretum.com
✔ Advanced restoration tools
✘ Pricey

Arboretum specialises in audio restoration tools. Among these are Ray Gun for cleaning up record and tape noise, and Ionizer to provide advanced CD audio mastering tools with EQ and compression. Restoration-NR is the high-end noise reduction tool for audio pros working at 24-bit/96Khz resolutions.

PLAY IT AGAIN



DreamPoint Freeverb 2

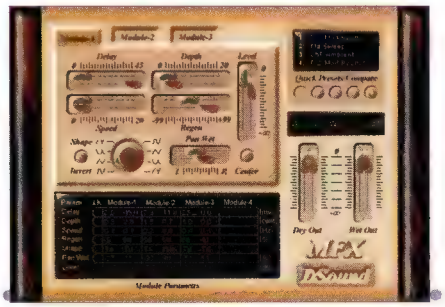
RATING 9 **Price:** Free **Web:** www.dreampoint.co.uk
✔ High-quality reverb for nix ✘ Unappealing interface

There are a lot of free DX and VST plug-ins around, but this is one of the best because it's something you might seriously use. The interface is not very appealing, but the quality of the reverb this produces is quite remarkable for something at this price (nix!). Check it out on this month's CD.

DSound Simple Audio Plug-in Pack 1 2.4

RATING 7 **Price:** $199
Contact: Innovative Music
Phone: (03) 9540 0658
Web: www.dsound1.com ✔ Great-sounding DirectX filters ✔ Great controls

This offers three DirectX audio filters — MFX (Modulation FX) for chorus and flange effects;

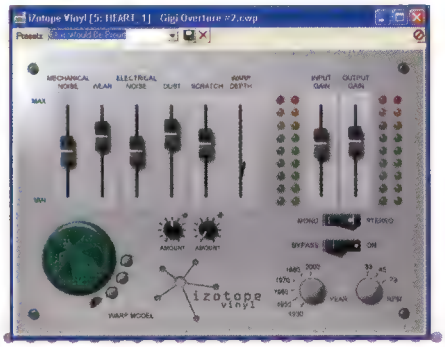


BPMDD (Beats Per Minute Double Delay), which lets you enter the tempo to match your song; and PEQ (Parametric EQ). There are many modulation, delay and EQ effects out there, but what sets these ones apart is the subtlety of their controls and the richness of their sound.

iZotope Vinyl

RATING 9 **Price:** Free **Web:** www.izotope.com ✔ Dirty up your sound ✔ Free

We looked at iZotope Ozone in the mastering and restoration tool reviews on page 54. Well, iZotope also makes this plug-in, which deliberately adds noise to

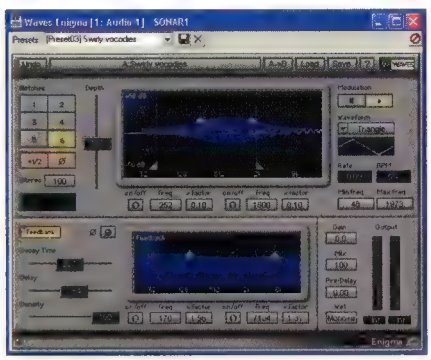


your music. Several presets are included to add light scratches and crackle, to vintage '50s and old record sounds. One is even called 'Scratched beyond repair'. So if you want to get that vintage sound and your records just sound too clean, you can use this to dirty them up. Also, check out Trash for more advanced distortion and grunge effects ($US229).

Waves Native Platinum Bundle

RATING 9 **Price:** $4,995 **Contact:** Sound and Music Promotions **Phone:** (03) 9528 5744
Web: www.waves.com ✔ All of the Waves plug-in packs in one ✘ Seriously expensive

Waves makes several high-end plug-in packs. The Restoration Bundle ($2,995) offers several dedicated audio restoration tools for noise, click, crackle and hum removal. The Renaissance Maxx Bundle ($1,495) and the Mastering bundle ($2,295) both offer tools for high-end audio mastering. The popular Native Power Pack ($1,295) has some of Waves' best tools, such as the L1-Ultramaximiser and TrueVerb. The Native Gold Bundle ($3,195) offers 32 separate plug-ins with several different EQs, several forms of compressor, flanges, reverbs, stereo spatialisers and heaps more. The Native Platinum Bundle combines all the effects from the Gold, Renaissance and Mastering packs for $4,995. Serious musos and engineers usually have at least one Waves bundle in their toolkit.



NOTATION TOOLS

These are the desktop publishing programs for music. Most will offer some MIDI capabilities for entering notes and playing back your score for preview on your soundcard, but these are not recording tools. They are primarily designed for producing musical notation for printout, and as such are used by musical arrangers and orchestrators, and publishers of sheet music. They can be used to prepare everything from a simple piano and vocal lead sheet; guitar tablature; to brass band, choir or full orchestral scores. >>>

DX & VST PLUG-INS

Antares Microphone Modeler

RATING 9 **Price:** $699
Contact: Major Music Wholesale
Phone: (02) 9545 3540
Web: www.antarestech.com ✔ Emulates expensive mics

One thing a small home studio cannot afford is a lot of expensive microphones. This plug-in will let you emulate the natural sound of a wide range of seriously expensive mics. All you need is one decent mic and you can model it to sound like anything else with this plug-in.

TECH TERMS

SoundFont. This is a sample-based patch file devised by Creative for their Sound Blaster range of soundcards. You load a SoundFont into memory and it can then play it as an instrument via MIDI from any music software. The format is also supported by some soft synths, so you don't even need a Sound Blaster card to use it.

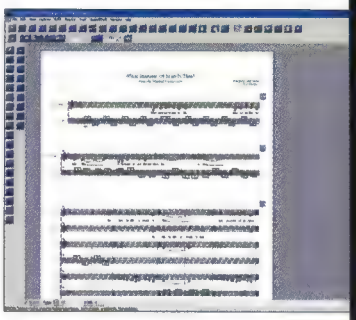
Wavetable. A popular format of digital sound synthesis that reproduces musical instruments better than the old FM (Frequency Modulation) format. Wavetable is supported by MIDI and many soundcards.

PLAY IT AGAIN

TECH TERMS

WDM. Microsoft's answer to ASIO. While technically this is just as good as ASIO, it is incumbent on manufacturers to provide well-coded WDM drivers, and many are still learning how to do this.

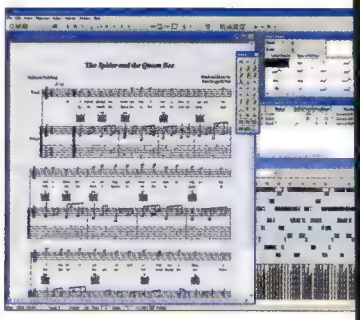
Finale 2003a



RATING 9 **Price:** $1,299 **Contact:** AUSMIDI **Phone:** (02) 9542 4105 **Web:** www.finalemusic.com ✓ Handles complex scores easily ✓ Cheaper versions available

There are several versions of Finale from Notepad (free) to PrintMusic! ($189) and Guitar ($239), up to the full program reviewed here. Finale is the industry standard among professional orchestrators and music publishers, and it offers many tools that make light work of complex scores, such as Explode Orchestration, instant Part Extraction and its own powerful set of plug-ins. It also has the venerable Band-In-A-Box built in for instant MIDI arrangements. You can OCR scanned sheet music, and it has built-in SmartScore for audio to MIDI notation. MIDI playback and recording is well handled. There are a few things that seem harder than they should be, but this is a very powerful and versatile program overall, and would be at home in any serious musical arranger's suite.

GenieSoft Overture 3

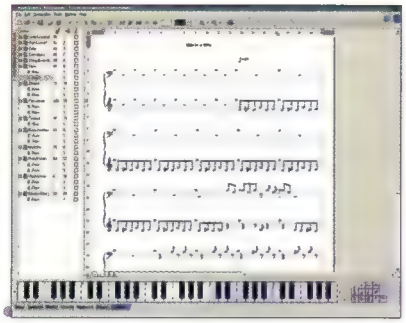


RATING 8 **Price:** $595 **Contact:** Intelliware **Phone:** (08) 8277 1722 **Web:** www.geniesoft.com ✓ Handles traditional or MIDI notation ✗ No auto arrangements

This is a midrange notation tool that has at least one thing most others lack: a piano roll MIDI editor. If you're more used to MIDI recording than traditional notation, this could be a godsend. Tools drop down from the toolbar along the top and can be pulled off if you want. You can import from Encore, MusicTime or MIDI and there is some control over how the score is presented. Lyrics, chord symbols and guitar tabs are all supported. It includes some high-end features like part extraction, but it doesn't do auto arrangements or scanning. The score is not as easy to finetune as others for printout, but this would still serve schools or band leaders quite well. For less ambitious users, there is the entry-level GenieSoft Score Writer 2.

MagicScore 3.3

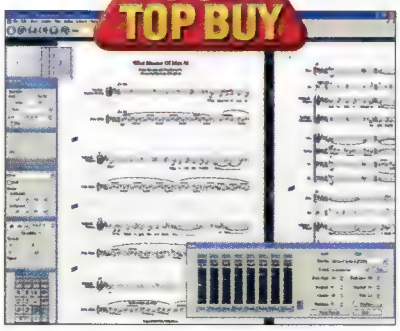
RATING 7 **Price:** $US20 **Web:** www.musicaleditor.com/magicscore.php ✓ Cheap ✓ Imports from MIDI keyboards ✗ MIDI instruments not integrated



This offers a good selection of symbols and lyrics. You can play back each staff over MIDI, and multiple staff systems can be created. Notes can input via an onscreen keyboard, with the cursor (once registered) or input from a MIDI keyboard. MIDI files can be imported, but there is no control over how the data is processed and it doesn't convert into a multipart score. Instead, it gives each instrument its own separate set of pages. For the price, this is good value. But if you are serious about notation, you will quickly outgrow it.

Sibelius 2.1

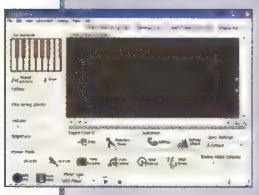
RATING 9 **Price:** $1,395 **Contact:** Intelliware **Phone:** (08) 8277 1722 **Web:** www.sibelius.com ✓ Very easy to use ✓ Handles complex scores



This is rapidly supplanting Finale as the favourite tool of professional orchestrators and publishers, and is our pick of the bunch. There are tool palettes covering every symbol imaginable, excellent import options, good MIDI playback and recording support, and intuitive keyboard shortcuts for everything. Part extraction and auto arrangement is easily handled, and Photoscore Lite is included for scanning sheet music. There are also several nice touches, such as coloured note heads, to show when you are out of the normal range of an instrument. But what sets it apart is its fluid desktop publishing approach and instant visual response. It is a joy to work in it and highly recommended. But if guitar tablature is more your thing, check out Sibelius G7 for $399. PCU

UTILITIES

Digital Ear 4.02



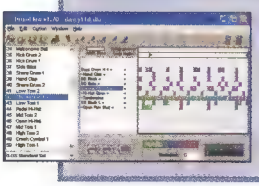
8 **Price:** Standard, $US79.95; Real-Time, $US119.95 **Web:** www.digital-ear.com ✓ Audio to MIDI converter that mostly works ✗ Don't expect miracles

This audio-to-MIDI converter will take a WAV file (16-bit/44.1kHz, mono) and convert it to MIDI format. It will also convert on the fly from a live source. This is strictly for individual sounds playing a simple melody line, but it copes with complex sounds and chords pretty well.

DrumFlow 1.7

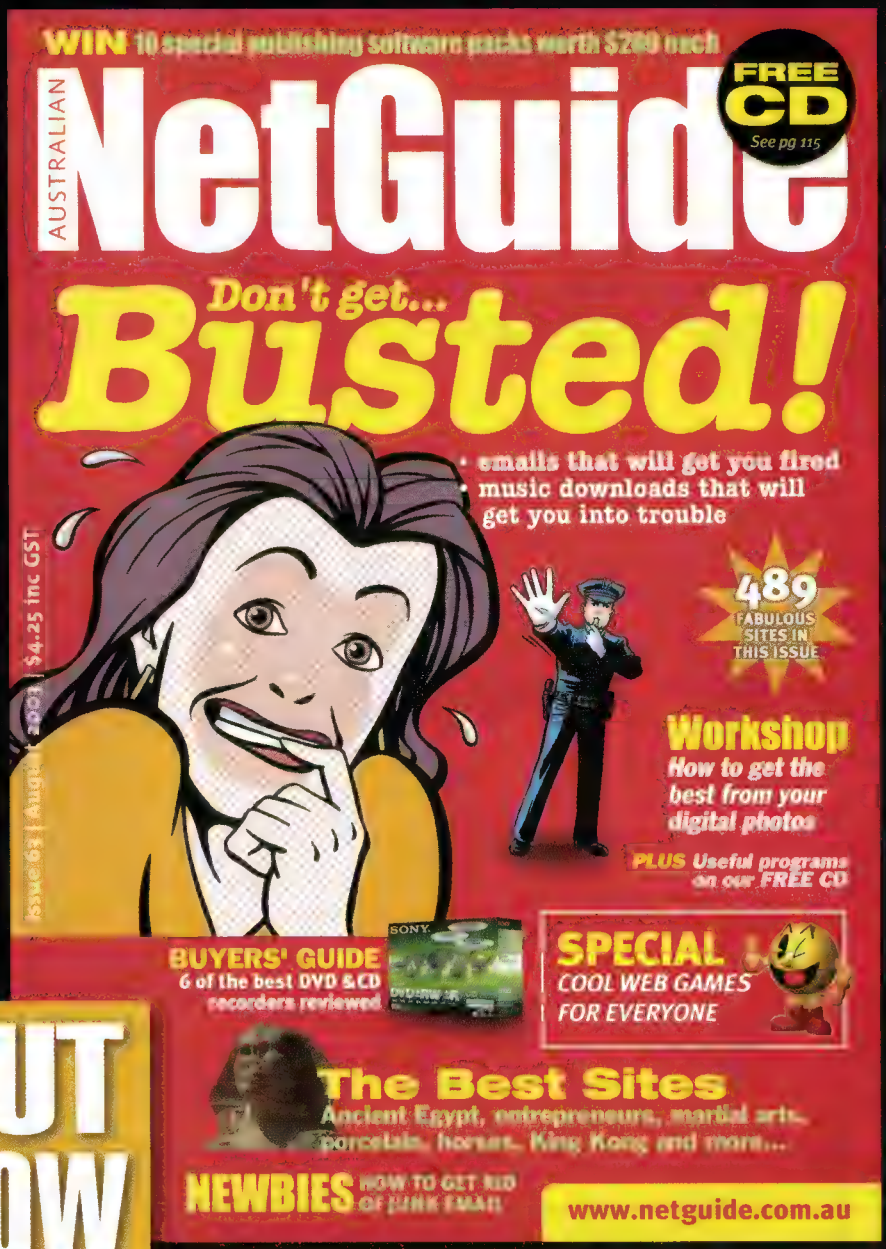
8 **Price:** Free **Web:** http://tnikolai.virtualave.net ✓ Free MIDI drum kit ✗ Interface is a bit rough

You can use this as a standalone program to create MIDI drum patterns. It supports GM, GS and XG formats, including some NRPN (Non-Registered Parameter Numbers) and Sysex (System Exclusive) commands to finetune the actual sounds. To get your finished drum patterns into your composing software, use the clipboard to copy and paste. If you don't have a decent drum grid in your composing software, this could be useful. But it needs a bit of work in some areas.



You already know who helps you get the most out of technology...

But are you stuck on the Web?



OUT NOW

Australian NetGuide – gets you to the best stuff on the Net

PLAY IT AGAIN

From vinyl to CD

Philip Moore presents this complete guide to digitising analog music, converting and compressing audio files, and mastering audio CDs.

Digital audio has matured to the extent that most tasks, from recording audio files to burning audio CDs, can be done very easily if you're prepared to stick to the basics. But step even a little away from the mainstream, and you really have to know what you're doing. In this feature, we'll look at three popular digital audio tasks: extracting and digitising audio from vinyl and other analog sources; converting and compressing audio files; and mastering high-quality audio CDs.

VINYL REVIVAL

Whether you want to rescue music from your old record collection, or you've been caught up in the current revival of vinyl and turntables, you'll want to extract and digitise tracks from the records and burn them onto CD. After all, even if you prefer the sound from vinyl, as many audiophiles do, you can't play records in the car or in a portable player on the train.

Here's what you'll need: a recent computer with a CD-RW drive, a soundcard, and a decent-sized hard drive. Any version of Windows from 98 onwards should be up to the task. You'll also need CD burning software such as Nero Burning ROM, or the shareware RecordNow MAX, which we'll use in this guide.

The one other piece of software you'll need is a WAV editor. See our comparison on page 51 to get the right one for your needs. We'll use the popular shareware audio editor Cool Edit 2000, which you will find on this month's cover discs. Another handy tool is a track splitter, like LP Ripper, which is also included on the CD.

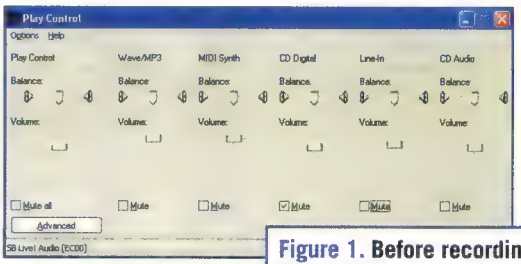


Figure 1. Before recording, check Windows' Master Volume control and make sure the Line In fader is up and that it is not muted.

Of course, you will also need a good turntable (with a pre-amp) to play your old records on, and a way to connect it to your PC's soundcard (see 'Making the connections' at bottom left).

Test run

With the turntable/pre-amp connected to your computer, and your WAV software installed, you're ready for a test run. First, check Windows' Master Volume utility. You'll find this as a little speaker icon in the system tray on the right-hand side of the Windows taskbar. (If this icon is not displayed in Windows XP, open Sound and Audio Devices Properties in Control Panel and check the 'Place volume icon in taskbar' checkbox.) Double-click the speaker icon and the Master Volume tool will appear, then check the Line In setting (see figure 1).

Now load up Cool Edit and make sure the Save option (option 1) is enabled along with option 5, which includes normalise. If this is the first time you have run Cool Edit simply close the sample file that loads. Put a record on the turntable and start playing it.

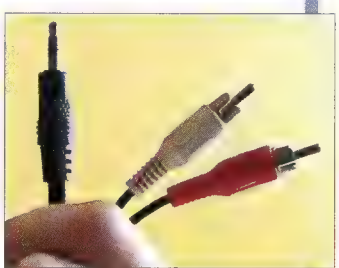
Click the red Record button at the bottom and select a sample rate (see figure 2 on page 66). We've included a comprehensive guide to sample rates and other audio file settings in the table on page 67. Click OK and Cool Edit will begin recording.

You should see the level meters at the bottom of Cool Edit bouncing in time to the music. Adjust the Line In volume on Windows' Master Volume, if necessary, so that Cool Edit's level meters are bouncing near the far right side without actually hitting the edge — that's as loud as possible before distortion.

Stop recording and you should see a waveform like the one in figure 3 on page 66. If you are not getting any level coming through, check Options —> >>>

MAKING THE CONNECTIONS

1 You connect your turntable to your PC via your soundcard's line-in socket on the back of your computer. If you have a hi-fi with a turntable that has a line out, all you need to do is get the right kind of cable to connect this to the line-in of your soundcard. Usually, this will require a pair of stereo RCA plugs at one end and a stereo phono plug at the other — this will have two black rings on the plug.



2 If you have a standalone turntable, this must be connected to a pre-amp first. Some new turntables have this built in, but most do not. Ask about this when you buy your new turntable to make sure it comes with a pre-amp that you can connect to your computer's line in (or the Aux input on your hi-fi for that matter).

"I never realised the simple act of plugging my PC into a power point would expose it to damaging problems"

- **Lee Johnson**, Home PC User

$200,000

Our Guarantee to You

If your properly connected equipment is ever damaged by a power anomaly APC will replace the product and reimburse the fair market value of the connected equipment up to $200,000. Visit www.apc.com/au for policy terms and conditions.

"The APC Back-UPS® CS keeps my business up and running regardless of the situation behind the plug in the wall. It integrates smoothly with Windows XP leaving me free to focus on my business, rather than on the technology."

- John Nagle, Small Business Owner.

"The spikes and surges coming in through the power socket were actually causing screen freezes, lock-ups, and other annoying problems."

- Lee Johnson, Home PC User

Do you experience similar PC problems? Keyboard lock-ups and frozen monitors are usually caused by bad power, which can threaten your PC up to four times a day. In addition, surges, sags and blackouts are nine times more likely to strike your PC than a virus[1] and are not just generated from lightning strikes. Something as simple as switching on a heavy appliance inside your home can jeopardise both your hardware and data. In fact, power disturbances are the largest single cause of data loss, accounting for 45.3% of problems.[2]

Why APC?

APC has a complete range of surge protectors and uninterruptible power supplies (UPS), protecting more computers than any other power protection brand. In fact, Lee Johnson is just one of APC's 12 million satisfied customers. Our solutions are also compatible with your existing equipment due to our partnerships with other leading IT companies, such as Cisco, IBM, Sun, Dell, Microsoft and more.

APC Desktop Power Protection:

the best value protection, ideal for home and small/medium business.

- Telephone, fax, modem and DSL line surge protection protects your PC while online.
- Up to 22 minutes[3] of battery back up time will keep your PC running during brief blackouts.
- USB and serial connectivity ensures compatibility with all equipment.
- FREE auto shutdown software saves files in the event of an extended blackout.
- Multiple battery and surge outlets and surge only outlets provide protection for all your equipment.
- 2-year warranty includes battery, spare parts and labour for added peace of mind.
- APC has won more awards for reliability and innovation than all other UPS vendors combined.

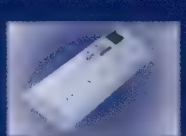
Trust the Legendary Reliability® of APC power protection solutions. Anything else is a compromise.

APC
Legendary Reliability®

Receive FREE Product Literature plus a chance to

WIN Desktop Power Protection

1 Back-UPS® ES to be won. Value $262



20 SurgeArrest® to be won. Value $80

Register on-line at http://promo.apcc.com and enter the code *49704k* or call toll free *1800 262 183*

APC Australia: Level 13, 65 Berry Street, North Sydney, NSW 2060
E-mail: anzinfo@apcc.com • Fax: (02) 9955 2844 • www.apc.com

©2002 American Power Conversion Corporation. All Trademarks are the property of their respective owners. APC4C2EF-AU Terms and conditions apply. (See http://promo.apcc.com and enter above code) Void where prohibited. Promotion subject to change without notice. Authorised

PLAY IT AGAIN

Figure 2. Using a WAV editor like Cool Edit, you'll need to record at 16 bit/44,100Hz, stereo for CD-quality audio.

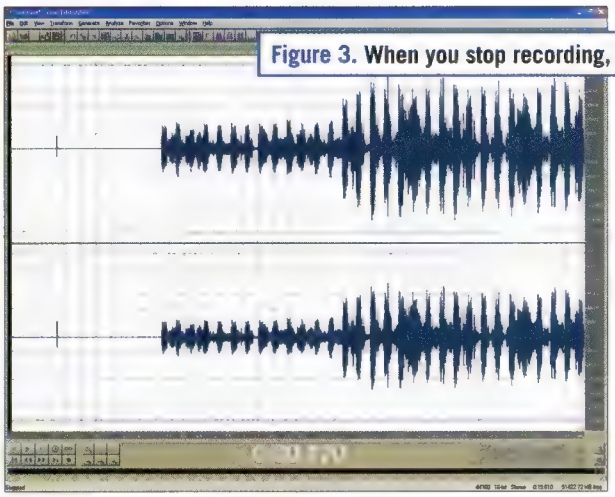


Figure 3. When you stop recording, you should see a waveform like this in Cool Edit.

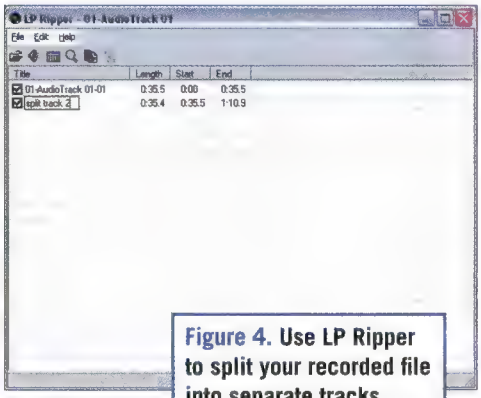


Figure 4. Use LP Ripper to split your recorded file into separate tracks.

Settings —> Devices to make sure your soundcard is selected as the correct Recording and Playback device. If you still don't seem to be getting any sound, make sure you have the cable connected to the right socket on the back of the soundcard (remember, line in, not mic in).

Recording the songs

Create a folder on your hard drive for your recordings so they are easy to find later. Clean the record you are about to play; the more you can reduce the possibility of any crackles and pops, the better. Start playing your record from the beginning of side one and click the record button. As you record, there is some processing you can do to the file to optimise it for CD (see 'Make old recordings better' at left). Now, because this is an analog source being recorded, the WAV editor does not automatically detect the tracks, so you have a choice. You can record each song one at a time, or you can record all the tracks on one side of the LP together, and then split them up later, which you can do automatically using LP Ripper (see figure 4).

To use LP Ripper to split your recorded file into separate tracks, you first need to add a Target Directory using the Edit —> Preference menu. Then open the WAV or TRK file you wish to split, using File —> Open. Select and highlight the file in LP Ripper, and go to Edit —> Split Tracks menu. It will then split the file and place it below the original. Repeat this until you have all the tracks you require. You can rename the files by single-clicking each one. Once you are happy, hit File —> Save Tracks to save the files.

Save each song with an appropriate name. If you are going to record the whole album as is, just call each song 'track01.wav' and so on. This makes loading them into your CD-R software in the correct order very easy.

Now listen to each song. Using Cool Edit, you can cut any unnecessary parts at the beginning of the file by highlighting that area of the waveform with the mouse and deleting. You can do the same at the end of the song, just be careful to keep all the fade-out.

Making the CD

With all your songs now recoded as individual files, load up your CD burning software. We'll use RecordNow MAX.

Open the program and bypass the wizard, then click the Audio button at the top. This will open an audio CD project. Simply drag files onto the main windows (see figure 5), until the bar at the bottom of the program indicates that the disc is full. If you want to check a song, double-click it and it will load into Media Player.

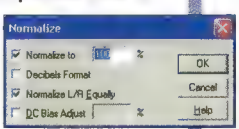
Click the Options button and set it to 'disc-at-once' (DAO) Closed. By default a two-second gap will be placed between each track. You can modify this with the Pre-gap button (see figure 6). Now, all you have to do is insert a blank CD-R and click the red Record button.

Recording from cassettes

The above techniques apply equally well to cassette tapes. Simply connect the line out from your hi-fi or cassette deck to the line-in of your soundcard. Because tapes, especially old ones, can tend to lose 'top end' and sound muddy and flat, it would be worthwhile applying some EQ to boost the high frequencies (treble). However, the danger here is that you will also be boosting tape hiss, so try some noise reduction as well.

IMPROVING AN OLD RECORDING

All WAV editors offer some effects that can be useful in improving the overall sound of the music you have recorded. Here are the most important ones to know about.



Normalise. If you do nothing else, use normalise. This will ensure each song is as loud as possible, without distorting it.

Equalisation (EQ). If you are recording from very old records (1960s and earlier), you may want to try applying a bit of EQ. This will allow you to boost the bass or add more treble to compensate for a dull recording. Bear in mind that this will change the original sound, so don't overdo it.

Dynamic Compression. This will squash the sound and make it seem much louder overall. Most modern music is already compressed, but older recordings are not. This can be a good way to enhance the energy of old rock and pop music, but not for classical, jazz or folk. Use judiciously.

Noise Reduction. Cool Edit comes with excellent noise reduction built in, which can help remove tape hiss or turntable rumble. You will find these under the Transform menu. Some audio tools offer special filters to help clean up old recordings from vinyl or tape. Roxio Easy CD Creator 6 does this very well, along with dedicated tools like DART XP Pro, or mastering tools such as Steinberg's Clean.

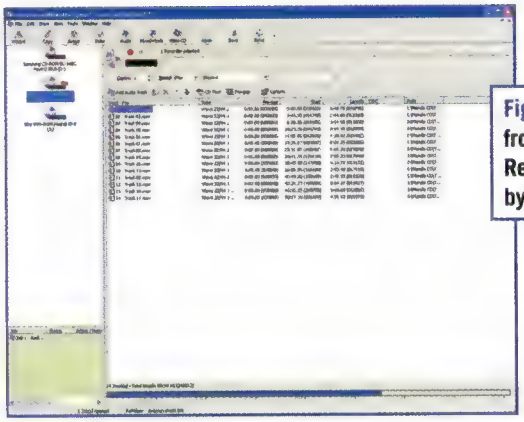


Figure 5. Drag and drop all song files from a Windows file window into RecordNow MAX and change the order by dragging the titles up or down.

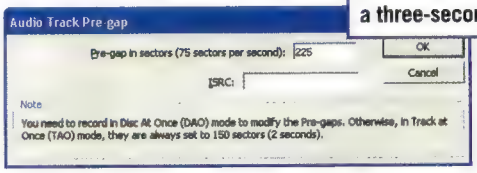


Figure 6. You can modify the time between each track by using the Pre-gap button. This measures the gap in sectors (75 sectors per second). In our example, 225 is selected for a three-second gap before this track.

YOUR GUIDE TO AUDIO FILES

Digital audio files are simply a recording of a sound, just like a digital tape recorder. However, they are recorded, or converted, using three basic parameters.

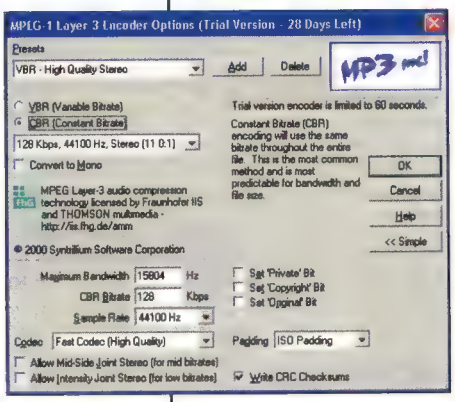
1. **The 'word' size, which stores the information (such as 8 bit and 16 bit).** This has a direct impact on the file's background noise (or, more specifically, its signal-to-noise ratio or SNR) and its dynamics (the volume range between the softest and loudest parts of the song).
2. **Sample rate (measured in kilohertz).** This is a measure of how many times per second the sound is sampled. This impacts on the frequency range and therefore the volume and quality of the extreme high and low notes. Each individual sample is stored according to the word size.
3. **Channels.** Mono, stereo (two channels) or more.

Audio files contain waveform data, with a header that contains information about the waveform, including the above characteristics and, if needed, compression information. Some audio file formats may also specify information about how the audio should be played as a musical instrument. This is used in file formats such as SoundFonts or ACID loops for use by a sampler or a loop-based composition tool.

Of course, the bulk of a digital audio file is the millions of individual samples that make up the recording of the waveform. Every minute of uncompressed CD-quality (16 bit/44.1kHz, stereo) audio requires about 10.5M per minute.

Often, recording or converting an audio file is a compromise between sound quality and file size. A file with a low sample rate and word size will be very small, but it will sound terrible. To help you get this right when using a WAV editor or other audio software, we've provided a guide in the 'What sample rate should I use?' table below. >>>

WAV editors such as Cool Edit allow you to adjust settings, such as the sample rate and bit rate, when converting a file to MP3.



ON THE CD

You'll find the shareware or trial versions of Cool Edit 2000, RecordNow MAX and Cool Edit Pro 2 with CD-R plug-in, along with the full version of LP Ripper and lots more audio software on this month's cover CDs. Philip Moore has also provided in-depth videos of these digital audio tutorials.

WHAT SAMPLE RATE SHOULD I USE FOR AUDIO FILES?

'Word' size	Sample rate					
	11.025kHz	22.05kHz	44.1kHz	48kHz	96kHz	192kHz
8 bit	Low quality with noticeable loss of high frequencies, but acceptable for voice and multimedia work. Dynamic compression and dithering will help minimise excessive noise. (0.66M)	Better quality with acceptable high-frequency loss. A good compromise if you really need to keep the file size down. (1.33M)	Rarely used. You might consider it if you want the best-quality sound and the dynamics are heavily compressed, such as for voice narration. (2.65M)	Don't even bother	Don't even bother	Forget about it!
16 bit	SNR much better, though this combination is rarely used as the sample rate is too low. (1.33M)	This is the best compromise for most multimedia voice and sound. You could even use this for musical samples (especially bass sounds). (2.65M)	CD quality. Used for most audio CDs and the minimum for serious audio production work. For the average user making compilation CDs, there is no need to go higher than this. (5.3M)	This is the standard for most digital systems such as DAT recorders and DTS surround sound. It just gives that little bit extra headroom for quality high frequencies. (5.76M)	If you want to get superior frequency response then go with this, but you might as well go all the way and use 24 bit in that case. (11.52M)	Why would you bother?
24 bit	Don't even bother	Don't even bother	This will give you better SNR, which can be invaluable for audio processing. (7.94M)	For amateur musos wanting to conserve disk space, this is the best recording resolution to use. (8.64M)	For serious music production, this is the new recording standard. (17.28M)	This combination would be worthwhile if superior frequency response mattered to you, but how many soundcards support 192kHz recording? (34.56M)
32 bit	Forget about it!	Don't even bother	Even greater SNR, and most professional audio tools will process at this resolution, even if the source files are recorded at a lower quality. (10.6M)	If SNR is really an issue for you, try this. But it's best to leave 32 bit to effects processing and keep your files at 24 bit. (11.52M)	Again, you could go this far if you want, but it's best to leave the extra headroom for your effects when processing. (23M)	This one is for the future. (46.08M)

The above values are true for constant bit rate only. It is is not an exhaustive comparison, but these are the most common resolutions used by audio software.

File sizes are per minute and mono. Double this for a stereo (two-channel) recording.

Formats

There is a wide range of audio file formats around. Some are simply that — a format, such as WAV, the Windows format for audio files. Others are really a format based upon a particular compression codec, like MP3. Let's take a closer look at all the audio formats and compression schemes you are likely to encounter. We'll stick to the more generic formats available. Most audio and composition tools, of course, have their own proprietary formats as well.

AIFF/AIF (Audio Interchange File Format). Similar to WAV, but developed by Apple for the Mac. It's a very comprehensive format and can be compressed as AIFC. Supported by most good audio or compositional tools on either PC or Mac.

ASF (Advanced Streaming Format). This is Microsoft's answer to Real Audio. It is also a lossy compressed format intended for Internet streaming playback.

AU or SND. This is the format defined by NeXT and Sun platforms, similar to WAV and uncompressed. You may still come across this on the Web for sound effects and other short sound snippets, but it is becoming rare. Many programs support it just in case.

MP3. MP3 is the Net's most popular downloadable audio file format. The name is derived from the fact that this is based on the audio compression originally designed for MPEG-2 video. There are three 'layers' of audio compression specified in MPEG, with layer 3 being the best possible quality — hence MP3. The actual implementation of this open standard (that is, the codec itself) was designed by two labs (Fraunhofer IIS and Thomson) who together own the rights to it and from whom developers must license the codec. This is why most freeware/shareware MP3 tools don't actually include the codec, relying on you to have a third-party one installed. Commercial tools license the codec and build it into their interface.

Ogg Vorbis (OGG). Similar to MP3, this is a more recent open source compressed audio format, designed in part to get around the licensing requirements of MP3. It's not as common as MP3, but it's actually a better format, with files capable of better sound quality and more compression. A great alternative for playing tracks on your PC, but not yet widely supported by portable MP3 players. See www.vorbis.com for more information.

PCA (Perfect Clarity Audio). This is a format devised by Sonic Foundry (makers of Sound Forge). It is the only playable compressed format that is not lossy, reducing the file size by about a half to a third. However, this is a proprietary format and it hasn't really taken off.

RAW. This is sometimes used to define a digital audio file that has no header information. The data is all there, you just have to work out what the sample rate and bit depth are. Also sometimes called PCM (Pulse Code Modulation), which is the method used to record and store the wave data on most of these audio formats. This can be used to load any unknown audio format by ignoring the header, as long as it is stored as PCM data.

Real Audio (RA or RAM). This is the streaming audio format designed by Real technologies for the Internet. It is heavily compressed (using a lossy technique) and usually of much lesser quality than the original, but that's the compromise you have to make to get the file small enough to play well over the Internet. Requires the RealOne player to listen to it and is only intended for Internet audio.

SF2 (SoundFont 2). This is actually a patch format that may contain several audio samples organised into instruments. It was devised by Creative for their Sound Blaster Live cards, which will work as a musical sampler, but they are also supported by several software SoundFont players now, making this a more generic format. There is also a dedicated compressor for SoundFonts called SFark, which compresses them (not lossy) better than a regular ZIP archive.

SWA (Shockwave Audio). Designed by Macromedia for their online streaming Shockwave technology. This file is rarely seen on its own now, as the audio capabilities are now built into Director DCR and Flash SWF files.

WAV. This is the Windows standard for digital audio files, based on Microsoft's RIFF (Resource Information File Format). The format uses PCM to format the data and is not normally compressed, so it retains full quality. Always use this format for best quality when recording your own music, or ripping from CD. The format now supports up to 32-bit/192kHz encoding, which is intended for

AUDIO COMPRESSION

There is really only one reason to use file compression: to get the file size down. Compression will slow down the processing of a file and usually degrade the quality, so it is not something you would do when recording or ripping an audio file. However, for distribution of a song over the web, for example, it is essential.

- **The king of audio compression is MP3. The MP3 format uses what's known as a lossy codec (compression/decompression). This means it throws away some of the data to help make the file smaller, which results in a loss of quality (JPEG does exactly the same thing with digital images). As long as you don't overdo it, this loss of quality is negligible. An MP3 song sounds almost as good as the original recording, but comes in at one-eleventh of the size. It's a compromise that many people are willing to accept and is what started the boom in downloadable music.**
- **You can choose how much quality you lose by varying the bit rate and sample rate that you want the audio to play back at. This determines how many bits per second will play back and hence how much data is thrown away and quality lost. We've included a guide in the 'Choosing the right bit rate' table below, in which we have indicated the most common bit rate/sample rate settings to use. Note that this table is only suitable when using a constant bit rate (CBR). Many audio tools also allow you to use a variable bit rate (VBR), usually just in low, medium or high-quality settings, and the program does the rest.**
- **Using VBR results in a smaller file, with the data stream adapting to the content. On quieter passages, fewer bytes are used than with more complex sections. The disadvantage is some older MP3 players may not be able to play the file.**

WHAT BIT RATE SHOULD I USE?

Bit rate	Sample rate				
	8khz	11.025kHz	22.5kHz	32kHz	44.1Khz
320Kbps	Don't even bother	Don't bother	Pretty good	Sounding good	Almost as good as the original
256Kbps	Don't even bother	Sounds good, though dull	Stereo's OK at this quality	This is a better compromise	Sounding great
128Kbps	Try this for stereo	Not bad, still sounds dull	Not bad	This is a good compromise	The most common best-quality compromise
96Kbps	Gee, it sounds pretty muddy	Getting a bit noisy	I can live with this	We're losing it, but the size is good	Pretty darn good
56Kbps	Sounds familiar	We're losing it	Not so awful	At least it's small	It'll pass
16Kbps	I think I know this song	How small do you want this file, seriously?	Pretty awful	Yuck!	Don't even bother
8Kbps	Is this music?	Ick!	Don't even bother	Don't even bother	Don't even bother

professional audio users. However, being strictly stereo, it does not support 5.1 surround sound. You may also find a few other variations of WAV, such as ADPCM encoding which compresses at 4:1, or ACM (Audio Compression Manager), which lets you choose an audio compression codec (such as MP3) to compress the data within the WAV file. These are rarely used and the user must also have the codec separately installed.

WMA (Windows Media Audio). This is Microsoft's alternative to MP3, but it uses slightly different bit rates and superior MPEG-4-based compression, producing smaller files for better-quality sound than MP3. It also offers support for Digital Rights Management to enable the purchase of songs online for permanent or limited playback. This was a strategy intended to provide a solution to the online piracy of music and provide a means to legitimately purchase music online. However, it hasn't really taken off.

MIDI

MIDI (Musical Instrument Digital Interface) is not a digital audio file format like a WAV or MP3 file. It is designed as a protocol for communicating with and recording a synthesiser performance.

This synthesiser might be a MIDI keyboard such as those reviewed on page 112, or it might be software (a soft synth), like those reviewed on page 58. MIDI files are very small in size, since they do not record the actual sound, but rather the performance, using a series of commands.

When you play back a MIDI file, the sound it produces is entirely reliant upon the quality of your soundcard's MIDI synthesiser. This synth comes with a range of musical instrument sounds built in (called patches).

The MIDI file defines what patches are used and how they are played, under a specification called General MIDI.

MASTERING AN AUDIO CD

Do you want to create a demo CD of your music, or even create a master for replication so that you can sell your CDs? Or you may want to create a compilation CD from a range of sources, including old recordings. Either way, an important final part of the recording process is mastering. Let me start by saying that if you are a serious musician wanting a professional-standard master, save up and go to a good mastering studio — one with an experienced engineer using expensive outboard hardware.

If this is beyond your resources, this DIY guide will get you there, with the right kind of software and a good set of ears. The best affordable PC tools for this sort of work are Sonic Foundry's CD Architect or Steinberg's WaveLab (see reviews on pages 54 and 51, respectively); or, for audio restoration work, programs like DART XP Pro (see review on page 52).

I want to base this guide on something you can actually use, so we'll use the trial version of Cool Edit Pro 2 with the CD-R plug-in (available on this month's cover CD).

Track layout

Install Cool Edit Pro and its CD-R plug-in, then load it up. Load your song files into the Organizer window and lay them out to suit. You could put every song in order on the one track, if you want to apply the same effects to every track and don't want to add cross-fades or other effects between songs. Otherwise, put each song on a separate track.

Place the cursor at the end of the last song and you will see how much time you have used up. Remember, even if your CD-RW drive supports 80-minute discs, you should keep the content to under 74 minutes, especially if you are producing this master for replication. This is the official standard.

Our step-by-step guide on page 70 shows how to load and move the tracks, add some effects, and make the final burn using Cool Edit Pro. Here's a bit more detail on the tricks of the trade.

Using effects

There are many effects you can add to your audio CD. These effects are real time and nondestructive, so you can fiddle and change them at any time, even while the song plays, without changing the original audio file. The key effects to use in mastering are EQ and dynamic compression, but you can also play around with others, although there should be no reason to use advanced effects like reverb pitch stretching, delays or distortions. If these are called for, they should already be in the mix.

Fiddle with each effect's controls until you get the sound you want. The general rule with using any of these effects is trust your ears. You'll need to use good speakers, of course, or a few different types of good speakers, if possible, to ensure that your CD will sound as good as possible on a range of systems.

And take your time. Play the song over and over, making fine adjustments, until you're happy. If in doubt, be conservative, using the minimum amount of the effect necessary. You want to showcase your music, not Cool Edit's effects, don't you?

EQ and dynamics

EQ is just like a complex version of the graphic equaliser on a home hi-fi unit, allowing you to boost or cut the volume at specific frequencies in the music. You may want to use it to clean up any muddiness or bring the vocals forward slightly.

Dynamic compression is completely different from file compression. It's designed to 'squash' the sound's dynamics, making the soft parts louder and the loud parts softer. This gives the entire sound recording a more even and constant sound. Just listen to any popular song and you will notice that the singer seems to always be singing at the same volume, regardless of whether they are whispering or shouting.

Compression is frequently used during all three >>>

BEFORE MASTERING

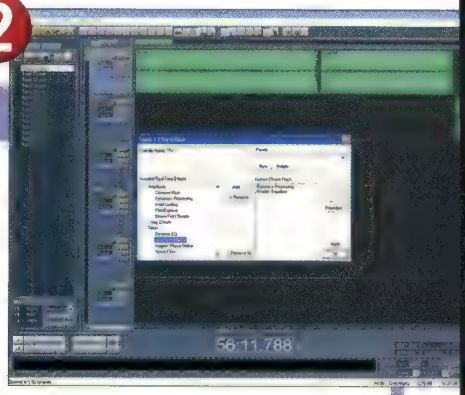
There are a few things that you should do before you get to mastering. When creating the final mix of your song in your composition software, make sure it sounds as good as you can get it, complete with pan, relative levels and reverb in place. Burn frequent test discs and play these in as many different CD players as you can to see how it sounds on different systems. Then go back and make any changes that need doing. Once you have every song mixed down to a stereo master file you are happy with, it's time for the icing on the cake: mastering.

PLAY IT AGAIN

STEP BY STEP: MASTERING WITH COOL EDIT PRO

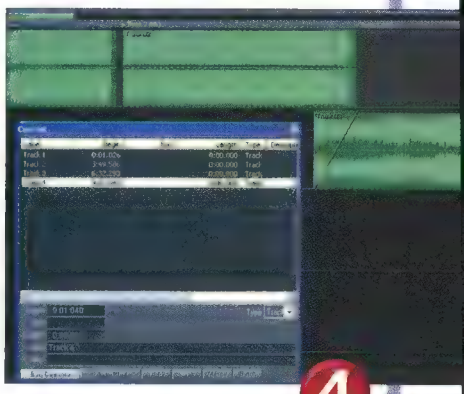
1 Load your song files into the Organizer window on the left, and switch to multitrack edit mode using the button in the top left (under File). Now, lay out your songs in the Tracks window and line them up with the correct pauses between each song. You can move them around by right-clicking and dragging.

2 Click the FX button at the left of track one. Select Dynamics Processing and Graphic Equalizer. These are the best to start with, but you can try others as well. Click the Play button and fiddle with the effect's controls until you get the sound you want. With Dynamic Processing, you may want to give each song more presence and punch with a bit of dynamic compression — but not too much!

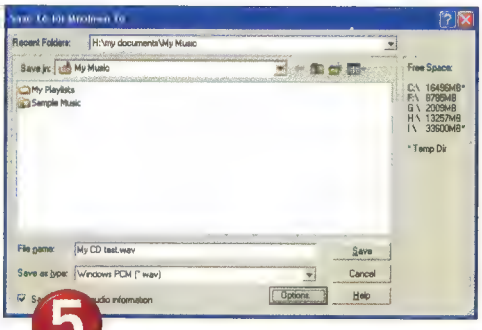


3 The EQ filter allows you to boost or cut the volume at specific frequencies in the music. For example, if you want to bring the vocals forward, you would push some of the central faders up and perhaps bring the outer faders down. Listen closely and take your time adjusting the faders. And again, err on the side of caution.

4 If you want to cross-fade songs, place them on separate tracks and use the Volume Envelopes to create fades, as shown. An important final step is to add Cue Points. Open the Cue List (Alt-8). This will add cues that can function as track markers (PQ markers). Place the cursor where you want each track to index to start and click the Add button in the Cue List window. Then be sure to make this cue type 'track'. Each cue need not be at the start of an actual clip, and you can add as many as you like, wherever you like.



5 Save your layout as a mixdown. Be sure to check the 'Save extra non-audio information' box. This will ensure the track cues are retained.



6 Now switch to single-file mode by clicking the button under the File menu, and load the mixdown WAV file you just saved. You should see all your carefully placed cues still in place. Now select CD Burning from the File menu. Find your mixdown file in the Source Files window and double-click 'All Cues to Cues'. Now pop a blank CD in the drive and click Burn.

<<<

stages of music production: recording, mixing and mastering. It can be used simply to avoid technical problems like distortion, or as an effect in its own right. Too many modern CDs are overcompressed during mastering because of loudness envy. They want to sound as loud, or louder, than someone else's CD. As a result, they lack dynamic range. We have previously gone into some detail about EQ and dynamic compression, so refer to our January and February issues for more information.

Final touches

There's lots more you can do to get your CD image just right. You can add cross-fades between songs using volume envelopes, and you can play with pan and effect envelopes in the same way.

You then save all the tracks as one 'mixdown' WAV file, load that file from Cool Edit's CD Burning dialog, and recheck the overall time of your CD again. You shouldn't need to do anything else, expect perhaps Group Normalize in the Processing tab to add a final balance to the CD. PCU

PLAY IT AGAIN

DIY movie DVDs

Joshua Rodriguez **shows you how to use your full version of CyberLink PowerProducer 1.0.**

Want to make your own movie discs or share photo slideshows with friends? With CyberLink's PowerProducer 1.0, you can take your home movies or photos and burn DVDs or VCDs, complete with professional-looking personalised menus. Best of all, PowerProducer is one of the easiest DVD authoring tools that we've used, thanks to its wizard-style interface. Even so, this tutorial will help you get started.

To start using PowerProducer, just install the program from our cover discs and register via the site link provided on the CD. Follow the onscreen prompts, then type in the registration code you receive via email after registration.

From the startup page, select the Produce Movie Disc option. This will take you to the format selection section of the program. Pick the disc format you want to burn to — DVD, VCD, Super VCD or Mini-DVD. If you don't know what these mean, highlight each one and click on the 'i' icon to get a description. From the country drop-down list, it's important to select Australia, as we use the PAL TV format. Depending on the type of disc you want to author, PowerProducer will also give you an extra set of options from the Video Quality listing. We decided to go with the highest quality. Now click on the forward arrow.

You can now import your movie by clicking on the name of your video capture device listed under Video Devices and clicking on the Record button. If you wish to import a movie file from your hard drive, click the Import Video Files button and select the files you want to load. Alternatively, under Extra Features, you can create a picture slideshow in much the same way. PowerProducer allows you to capture videos or photos from a digital video camera, TV, capture card or digital still camera, and import DV-AVI, MPEG-1, MPEG-2, MP3, WAV, JPEG and BMP files. Make sure you press the green forward button when you've finished importing your movies.

PowerProducer then takes you to the Preview section. This is where you can preview your movie. You can customise your presentation menu and buttons by clicking the Authoring button under Extra Features. In the Authoring section, you can adjust the placement of your movie buttons, change background images and add music. You can also adjust your title names and font.

The Final Output section is where you burn your movie. You can add a volume label to your creation, as well as adding the PowerDVD runtime files that enable friends to watch your movie on their PC without the need for DVD playback software. This section also gives you options for burning directly within the program, saving as an image file or saving as a DVD format file system for burning with an external program like Nero. Once you are happy with your movie, just click the Burn button to create your DVD. PCU

STEP BY STEP: MAKE YOUR OWN DVD MOVIE

1 From PowerProducer's startup page, select the Produce Movie Disc option. Now select the disc format, the country and, if applicable, the quality you would like to use.

2 Now, select your video capture device from the Video Devices list, or choose Import Video Files if you want to load clips from your hard disk.

3 In the Preview section, you can preview your movie or customise your menu by hitting the Authoring button under Extra Features. Here you can change your titles, fonts, move buttons, change background images and add music. Once finished, you can proceed to the Final Output section to burn the disc.

Use MIDI to make music with your PC

Have a music keyboard? Darren Yates shows you how you can link it up to your PC.

It seems that a product hasn't really made it in the world these days unless you can connect it to your PC. Digital cameras, MP3 players, mobile phones, PDAs — they all connect to your computer, allowing you greater flexibility over the peripheral and opening up a greater range of features.

Music keyboards have been around for a good decade or more, and although they may not be a common accessory for your PC, they certainly can connect to your computer. Even budget keyboards since the mid-'80s have featured what's known as the Musical Instrument Digital Interface (MIDI) port, allowing them to be connected to electronic devices, including PCs, ever since.

In many ways, MIDI was a technology that emerged before its time — it was smart enough that it didn't actually transfer audio between devices, but rather it transferred just the control signals, such as which keys are being pressed, how they're pressed and other information including tuning, reverb and which instrument voice you want it to play. The result was a five-minute song with five instruments that could easily fit into a tiny 50K file.

One of the best things about MIDI has always been the small file sizes, but one of the drawbacks, at least in the early years, was that you had to spend big bickies to get decent digital instrument voices. Also, the MIDI sequencer software required to make it work on your PC used to cost an arm and a leg. Today, MIDI still survives as the keyboard connection of choice, but voice quality has improved dramatically, prices have dropped and the software to create your own MIDI music is now available online for free.

What you need

If you have a keyboard, check to see if it has at least a MIDI-out port. This is a five-pin DIN socket like the one in step 1 of the guide on the opposite page. If it does, most of the hard work is done.

What you need next is a MIDI-to-joystick interface cable or breakout box. You can pick up one of these from your local music store for about $40 to $50. It links the keyboard and the PC together, but you still need software to enable your PC to talk to the keyboard. And that's where this month's cover CD comes into play.

We've included Digital Sound Planet's Quartz AudioMaster Freeware MIDI sequencer for your use. It records and plays MIDI files through the cable to your keyboard, or simply to the MIDI synthesiser built into your PC's soundcard.

Installing the cables

The trickiest part of this whole operation is installing the cable. MIDI ports are monodirectional, which means data only flows one way, and it's the reason why you get MIDI-in and MIDI-out ports. It also means you need to connect the cables carefully for the whole thing to work.

If you've purchased a MIDI-to-joystick converter cable, you'll need to check which five-pin MIDI connector is the MIDI-out and which is MIDI-in. The trick is that the MIDI-out connector has to connect to the MIDI-in socket on your keyboard, and the MIDI-in connector of the cable to the MIDI-out socket.

The twin cables enable you to use the keyboard to play your creations into the PC as well as use the PC to play back MIDI files through your keyboard. If you install the cable, but find you can't play any MIDI files through your keyboard and can't record anything either, try swapping them around. The same thing is true if you connect an external tone generator box to your keyboard — MIDI-out goes to MIDI-in and vice versa.

If you only intend to record music into the PC, you don't need to connect the cable to the keyboard's MIDI-in socket, as you only require data to travel from the keyboard to the PC.

A really great thing about MIDI is that provided you stick with just MIDI sequencing, you don't need a whizz-bang computer to run it — a 400MHz Pentium II should do quite nicely. Things only get tricky when you start adding in multiple audio tracks (such as vocals or live instrumental solos). That's when you need your PC to have some extra horsepower to ensure everything syncs up correctly, but even then, a 1GHz PC would be fine.

Once you've created your music, the beauty with MIDI is that even if you don't have a keyboard

MIDI RESOURCES

There are plenty of MIDI tools available online for you to try out. Two sites worth bookmarking are Harmony Central's MIDI software list (www.harmony-central.com/Software/Windows/midi.html) and HitSquad (www.hitsquad.com/smm/cat/MIDI_SEQUENCERS/). HitSquad calls itself the "musician's Web site" and once you've seen the extensive range of shareware it has, you'd be nuts to argue.

If you're handy with electronics, know how to use a soldering iron and can follow your way around a circuit diagram, you can build your own MIDI interface. Try John Loadsman's home brew MIDI breakout box for PCs at www.usyd.edu.au/su/anaes/rpa/Loadsmanextras/PCmidi.html.

You may still be able to find MIDI 'build-it-yourself' kits from Jaycar or Dick Smith Electronics.

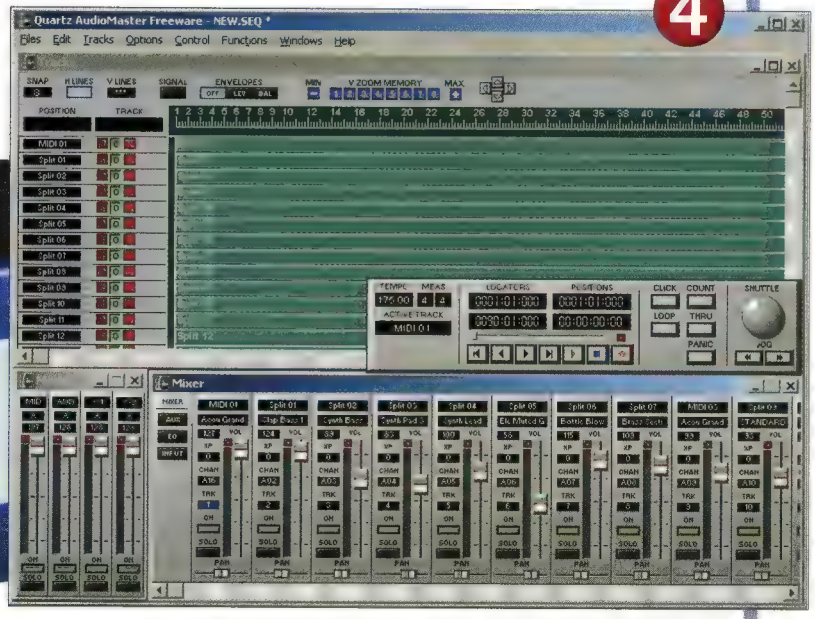
STEP BY STEP: CONNECTING YOUR KEYBOARD TO YOUR PC

1 Locate the MIDI-out and/or MIDI-in ports on your keyboard. If it doesn't have either, it won't work.

2 Pick up either a MIDI breakout box or MIDI-to-joystick converter cable for about $50 from your local music store.

3 When installing, remember the MIDI-out connector goes to the MIDI-in port on the keyboard and vice versa.

4 Fire up your favourite MIDI sequencer software or try out DSP's Quartz AudioMaster Freeware on this month's cover CD.



with great-quality sounds, you can feed the MIDI file into another device that does. There are even software tools that will turn your MIDI files into audio WAV files that you can then burn on audio CDs or turn into MP3 files.

Different options

Of course, while MIDI started out as a keyboard interface, it's since grown to encompass a range of instruments including guitars, woodwind (check out Casio's DH-100 Digital Horn at www.tierrahombre.com/dh100) and, would you believe, a MIDI harp (www.starrlabs.com). So, if you don't play the piano, there are other options for creating your own music.

That's the trick to creating MIDI music — if you want it to sound realistic, play the notes into your PC rather than just programming it. There are plenty of software tools that enable you to program music, but you won't get the same feel as playing the actual instrument.

The future

Keyboard and musical instrument vendors are eyeing off the PC at long last, and are beginning to update MIDI connectors to a simple USB port. Yamaha and Casio already have keyboards available that allow MIDI control through your PC's USB port, making connection simple. At this stage, you'll only find it on the latest keyboards around the $2,000 mark or higher. So, for the moment, the standard five-pin DIN MIDI connection is still the way to go. PCU

ON THE CD

On this month's cover discs, you'll find Digital Sound Planet's Quartz AudioMaster Freeware MIDI sequencer, which allows your PC to talk to your MIDI-enabled keyboard.

ChordWizard 1.5 up and running

John Hilvert shows you how to venture beyond air guitar and learn to play the blues with ChordWizard 1.5.

ON THE CD

You'll find the full version of ChordWizard 1.5 free on this month's cover discs. You'll also find the demo of the latest version of ChordWizard, ChordWizard Gold Edition 2.0.

CHORDWIZARD GOLD

ChordWizard is a terrific training and exploring tool for guitarists. If you like what you hear, you'll find extra features on the latest edition of the program, ChordWizard Gold Edition 2.0. ChordWizard Gold allows you to find chords for instruments with more than six strings and it includes a more elegant scales view area, a metronome, a tuner and a transposing tool to help you practise leads.

ChordWizard 1.5 offers a large database of chords and scales for stringed instruments from guitars to violins, and it's yours for free on this month's cover CDs. You'll never need to consult a chord book again. It provides much information and wisdom for musicians and wannabes seeking chords, but there are so many features that you could be overwhelmed by its possibilities. So, we'll show you how to use ChordWizard to learn and play the blues in A on your guitar. Air guitarists will be able to use their left hands more authoritatively as well.

After installing the program, you will be greeted with the main screen, featuring a fret board at the top, which displays where to place your fingers for the chosen chord. The chord menu is in the bottom left corner and its here that you choose which chord to display. Choose to display the A Major chord by clicking on it once from the chord menu, if it's not already displayed. As you may have noticed, there are multiple variations of the A Major chord available. For now, just choose the third option, as this is the easiest to play (see **figure 1**).

Now, get your guitar and copy the finger positions on the fret board with what is being shown onscreen. Play the chord. You can compare the sound from your guitar with ChordWizard's reference sound for A Major by clicking again on your choice for A Major (which should be highlighted). Hopefully, they sound alike. If the chords don't sound the same, check that your fingers are pressing tightly on the correct strings; if they are, your guitar's tuning may be out, so check that it is tuned correctly.

Once you have mastered the A Major chord, repeat this process with D Major and E Major (see **figures 2** and **3**). When you have learned how to play these chords and have a good idea of what the chords sound like, you can start on the strumming.

To play the blues in A properly, you will need to strum correctly. If / represents one downstroke, then the progression for blues in A is as follows: A////, D////, A////, E//, D//, A//, E// and then back to the start. Think Eric Clapton, but go for strict timing.

Once you are confident playing this progression, you can introduce other chords. Musicians typically add A Minor, A7, D7 or E7 chords to the progression in order to vary the overall sound and introduce so-called 'blue' notes. You can find these chords in ChordWizard's chord library, just like the other chords we worked with.

Once you have mastered the chord progression, you might want to try something more challenging,

Figure 1

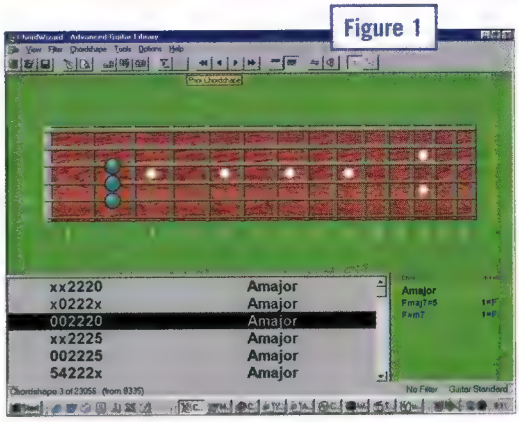


Figure 2

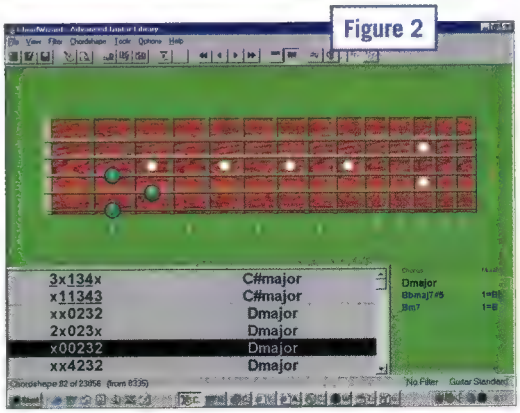
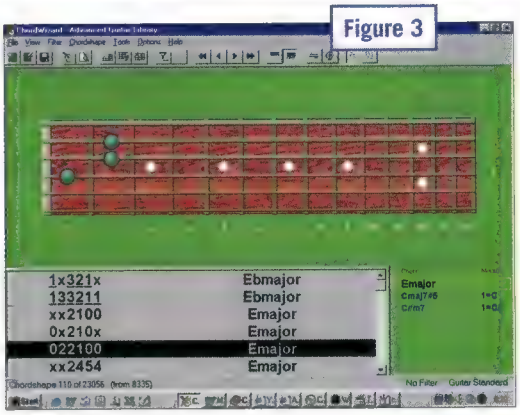


Figure 3



such as trying to play a tune over the top of your blues in A chords. To do this, select Tools —> Notes to Scales, cross the box next to A and select A Blues Scale from the box on the right. To view this scale on the fret board, click on the print preview icon, then on scale diagrams. PCU

The Net's best music resources

Whether you want to share your own music or find free (and legal) MP3 files, Rose Vines reveals the best tools for the job.

The Internet and music have had a rocky relationship. Not technically, where their compatibility is clear; but politically, where the interests of music lovers and of music owners have frequently been at odds.

The recording industry has maintained a running battle with fans seeking to share music over the Net. That battle has ended up in the courts on a number of occasions, with mixed results. The industry had a victory when file-sharing service Napster was shut down. Music swappers have also had victories, most prominently in April when US Judge Stephen Wilson determined file-swapping services such as Grokster and Morpheus were not liable for copyright infringements by people using their software. In Australia, the recording industry has shown it is getting serious by taking universities to court and winning a judgement that forces the universities to hand over network records in an effort to reveal suspected music piracy. Artists are ranged on both sides of the music downloading fracas.

Whatever the rights or the wrongs of the matter, there's no doubt that music distribution is undergoing a revolution. There's also no doubt that the Net allows you to expand your musical horizons — or at least your musical collections — with remarkable ease.

In this guide, we'll introduce you to the top digital audio sites on the Web, which give you the tools and resources to track down, listen to, download and share music.

File-sharing services

Top resource: KaZaA Media Desktop (www.kazaa.com)
Best alternatives: Kazaa Lite (www.kazaalite.tk); LimeWire (www.limewire.com)

File-sharing services inhabit the grey area of Internet music. The legality of the services and their software may still be in doubt, but the illegality of sharing copyrighted material using such services is pretty clear. It's a little like the situation with radar detectors, which you can buy legally in some states, but which you may not install in your car to detect radar traps. However, unlike radar detectors, there are clearly many file-sharing activities — such as swapping music you've created yourself — that are completely legal.

File-sharing networks use a technology known as P2P (peer-to-peer file sharing). P2P eliminates the intermediary server and allows you to share files directly with other PC users. So, instead of sharing a file by uploading it to a server on the Internet and having the recipient download it from the same server, any two users on the P2P network can swap files directly.

P2P sharing isn't limited to audio files. You can swap any type of file at all: graphics, video, programs, documents, and so on. Of course, to make the system work, all users must be willing to share files of their own. So, when you install a P2P application, it creates a folder dedicated to uploads, where you can place any files you wish to share.

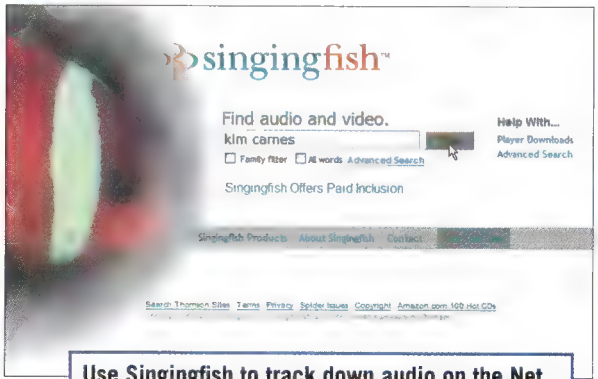
That should start the alarm bells ringing. Although safeguards are built into P2P programs, you should not run this sort of program on a PC containing sensitive data. You should also be fastidious about your antivirus software, as P2P networks are ripe pickings for virus writers.

Top dog in the current crop of P2P services is KaZaA Media Desktop (www.kazaa.com). In P2P-land, popularity is key, because more users on the network means more files available, more choice and better performance. KaZaA's major drawback is that it is riddled with adware and monitoring software. A bunch of KaZaA fans got together and produced an ad-free knock-off, called Kazaa Lite, which is sure to have ruffled feathers at KaZaA. And LimeWire provides an easy-to-use alternative that uses another popular P2P network, Gnutella. Note that the free basic version of LimeWire is supported by adware, but the full version is ad free and costs just $US9.95.

Music search sites

Top resource: Singingfish (www.singingfish.com)
Best alternative: Lycos Music (http://music.lycos.com/downloads/)

Using music search sites is often an exercise in frustration. Plenty of searches turn up no results whatsoever, especially when you're looking for Australian music. Even when you do get results, you'll often find the links lead to out-of-date, inaccessible or incorrect files. Or your search will simply lead to commercial retailers — often US-based — where you may buy the CD. And, the last straw, you're also sure to bump into dozens of pop-up ads >>>



Use Singingfish to track down audio on the Net.

TOP TIP
Audio players

There are four major formats for online audio: WMA, Real Audio, MP3 and WAV. To play Real Audio files, you'll need the RealOne Player from www.real.com/realoneplayer.html. Many media players will play all other audio formats, although for streaming WMA you may have to install Windows Media Player (www.microsoft.com/windowsmedia).

ON THE CD

We've included KaZaA Media Desktop, LimeWire Basic, the trial version of MP3-Wolf 2.0, the free version of MP3-Wolf 1.05, and the free RealOne Player on this month's cover discs. Unfortunately, it's illegal for us to distribute Kazaa Lite on the CDs.

«<<

along the way.

One of the best ways to locate music is to use a search engine and include the file type — MP3, WAV and so forth — as part of the search phrase. For example, a Google search for **kerrianne cox mp3** will lead you to a number of sample downloads of Kerrianne's work. Some search engines also include a specific audio search component. Both Lycos Music and AltaVista Audio (http://au.altavista.com/audio) do, but the results are often less useful than those provided by a straight Google search.

Of the dedicated audio search sites, Singingfish is in a class of its own. This sleekly designed search produces consistently more reliable results than most other sites. The site is well presented, making it easy to digest the results, and the advanced search allows you to specify a minimum length for the files (eliminating 30-second sound bites), a family filter, and the audio format. Singingfish works just as well unearthing classical composers such as Sculthorpe, Bryars, Mozart and Bruch as it does with pop and rock, and caters to other musical genres as well, including zydeco, blues and jazz.

Of the other search sites, MP3 Sound (www.mp3sound.com) provides links to the Australian, UK, US, Norwegian, Danish, Swedish, German and European top 10, giving it an edge over the US-dominated results from other sites.

Music search software

Top resource: MP3-Wolf 2.0 (www.trellian.com/mwolf/)
There used to be some choice in music search utilities, but many of them expired in the dot com bust. What's left are limited search facilities in some media players and the dedicated MP3 search tool, MP3-Wolf. MP3-Wolf looks like a product waiting for an upgrade that will never come. Even so, it does a pretty good job of tracking down MP3s lurking in strange nooks and crannies on the Web. Right-click on a matching file and select Download and you'll either discover the link is not currently functional, or the MP3 will download onto your system. The search engine is not particularly flexible, but it still turns up a lot of content.

The BBC sets the standard for Internet radio.

Internet radio

Top resource: Radio-Locator (www.radio-locator.com)
Best alternatives: BBC Radio (www.bbc.co.uk/radio), ABC Streaming Audio (www.abc.net.au/streaming/audiovideo.htm), Beethoven.com (www.beethoven.com)
Internet stations around the world stream individual programs or their entire output directly to the Internet. Those stations include 'real-world' stations such as 2CH in Sydney (www.2ch.com.au), BBC Radio 2 (www.bbc.co.uk/radio2) and WWOZ New Orleans (www.wwoz.org), as well as entirely virtual networks like Live365 (www.live365.com).

You can find a few of these stations using the built-in radio component in Internet Explorer or your favourite media player. You'll find a whole lot more by using Radio-Locator. Radio-Locator allows you to track down radio stations by country, call letters (US stations only) or music type. Although it has a US bias, it turns up over 250 Australian stations via its country search.

For the best one-stop radio experience, you can't beat BBC Radio, with over a dozen stations all serving up live and recorded programs. On the local scene, the ABC is the online audio leader, hosting live and recorded programs from stations such as Triple J, ABC Classic FM and Radio National.

Music downloads and subscriptions

Top resources: Internet Underground Music Archive (www.iuma.org) MP3.com (www.mp3.com)
Best alternatives: MP3.com.au (www.mp3.com.au), Global Music Network (www.gmn.com), eClassical.com (www.eclassical.com), Download Music Australia (www.downloadmusic.com.au), EMusic (www.emusic.com), Epitonic.com (www.epitonic.com)

TOP TIP

Check your cache

Audio from the Net which is played through Internet Explorer or a media player is often stored, at least temporarily, in your cache. If you want to save a song you've just listened to, try this.

1. In Internet Explorer, select Internet Options from the Tools menu.
2. On the General tab, click the Settings button.
3. In the Settings dialog, click the View Files button to display your Temporary Internet Files folder.
4. Right-click in a blank spot in the folder and select Arrange Icons By —> Type.
5. Scroll through the list and look for any audio files.

TOP TIP

Free audio software

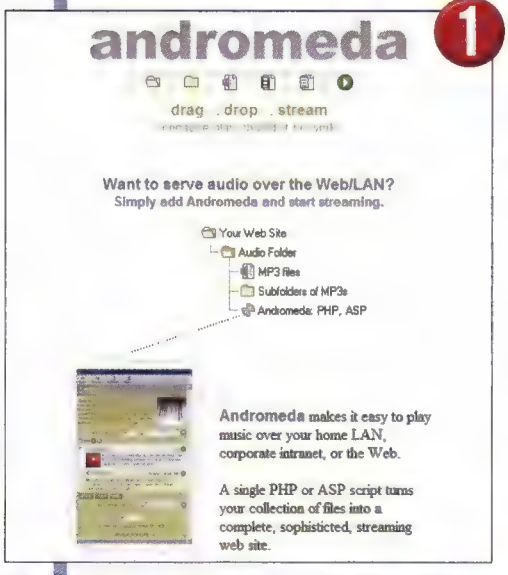
You'll find a huge array of freeware and shareware audio tools on the Net, ranging from rippers to powerful MIDI production software. Philip Moore has covered the best of these tools in his audio and music software features starting on page 46 — and we've got more in this month's CD burning and audio resource kit (see CD contents page 8).

TOP TIP

Save, don't open

Usually, when you click an audio link, the file plays automatically through your browser. But what if you want to save the file onto your drive instead of playing it? Many times, you can save a file by right-clicking its link and choosing Save Target As (in Netscape, it's Save Link Target As) from the pop-up menu. This doesn't work with all files and won't work with streaming audio, but it'll do the trick often enough.

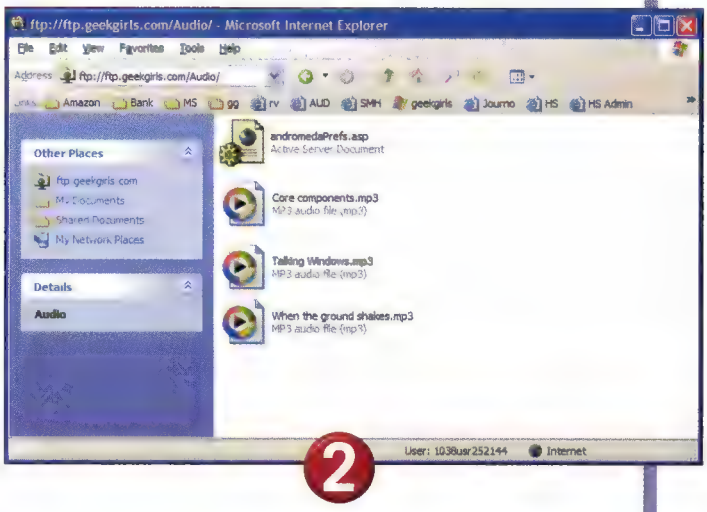
STEP BY STEP: CREATE YOUR OWN AUDIO SITE WITH ANDROMEDA

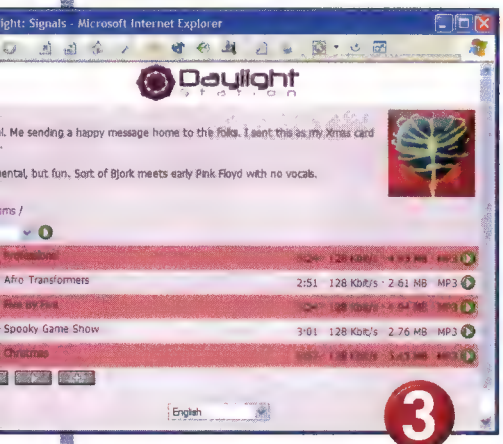


1 Do you have some music you want to share on the Net? Why not stream it on your own site? What was once a complex process is now extraordinarily easy, thanks to a tiny, inexpensive program script called Andromeda. All you'll need to broadcast your own words or music to the world are a Web server or hosted Web site that allows you to run PHP or ASP scripts; the Andromeda program from www.turnstyle.com/andromeda/spotlight.asp and some MP3s.

2 Andromeda requires minimal effort to get up and running.

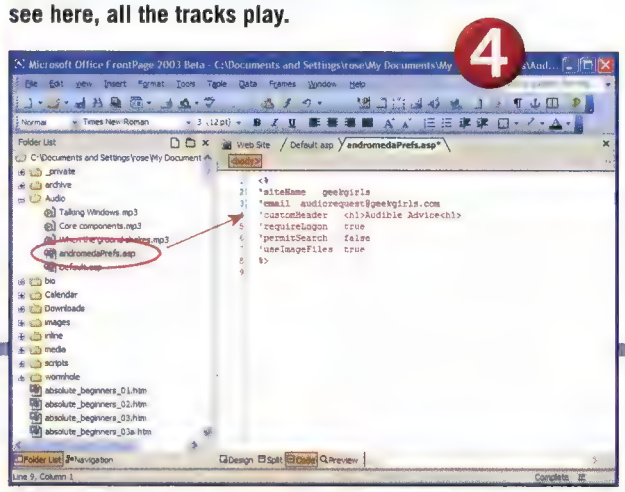
- Add an Audio folder to your site.
- Toss the Andromeda script into the Audio folder.
- Add some MP3s. Be careful about file size. MP3s chomp up space on your Web server. If you like, you can separate content into separate 'album' folders.
- Publish your site.





3 On your site, Andromeda displays a playlist of files, with intuitive controls. Cue all the tracks or play them one at a time. Using the 30-day evaluation version, Andromeda will play every second file in your audio list. On a licensed site, like the one you see here, all the tracks play.

4 To add some sophistication, create an Andromeda prefs file. This text file allows you to control who has access to your audio site; how the playlist displays; the site name; the search feature; and a whole lot more.



TOP TIP

Streams and downloads

Online audio is delivered in two different ways: as discrete files and as streaming audio. When you click a link to a discrete file, the file is copied in its entirety into your browser's cache or elsewhere on your hard disk. Once the download has completed, you can play the file in a media player or within your browser. Streaming audio is delivered as a continuous stream of data. As soon as the first section of the audio has been sent to your computer, the audio starts to play while the rest of the stream is delivered in the background. Streaming audio is used by Internet radio and news stations, as well as to deliver music.

Many sites house collections of music available for download. Apart from the short sample clips you'll find at online music retailers, some sites let you download complete songs for free. Sites such as Internet Underground Music Archive (IUMA) and Download Music act as springboards for new and budding artists. At these sites, the musicians upload samples of their music plus information about themselves, and site visitors can have a listen, get to hear some new music, and purchase full CDs. IUMA stages a particularly diverse collection of artists, from hip hop to classical a cappella.

Other sites charge for each download, either by the track, by the album, or by a monthly fee, although many of these sites also offer freebies including Webcasts and sample downloads. Before you sign up for a subscription service, make sure you get a good look at the catalogue. Each site has a limited library — albeit sometimes very large — and you want to make sure your tastes are well catered to before paying up.

Audio, of course, is more than just music. If you're looking for talking books, check out Audible's service (www.audible.com). It has an extensive stock of books downloadable to your desktop PC, Pocket PC device or portable music player. PCU

Allocating hard disk space

Rose Vines shows you how to use quotas to share disk space between multiple users.

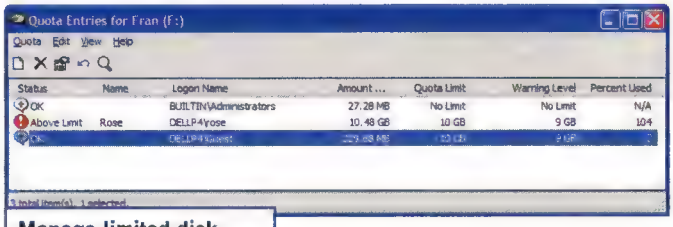
The first place where I worked as a computer consultant, we forked out about $3,000 to double the hard disk space on our Datamax PC from 5M (yes, megabytes) to 10M. The sales guy said it'd be "all the disk space you ever need", a statement which ranks right up there with IBM's Tom Watson saying: "The world will never need more than five computers."

Today, I sit at a desktop computer that costs, in total, less than that hard disk upgrade, and it has not one, but two 80G hard disks housed within. These days, disk space is so cheap, why not splurge?

That 160G of space is all I need. But then, I'm not a multimedia junkie, nor do I do more than dabble in video editing. If you happen to share a computer with someone who's heavily into video, animations, hi-res scanned images or hi-fi music, you'll be painfully aware that these space gluttons can make short shrift of 160G.

Before the tussle over disk space causes a family crisis, let me introduce you to Windows XP's quota management. Quota management has a rather authoritarian sound to it, but it is actually a nicely pragmatic way of sharing disk space fairly among multiple users.

Quota management allows you to set a limit to the amount of space each user may occupy on a hard drive. Once implemented, quotas make it appear to the user that the hard drive is no larger than their allotted quota, a good psychological ploy to keep them aware of the need for space management.



Manage limited disk space by applying quotas to rampant users.

Quota quirks

Before you start carving up the gigabytes, you need to know the ins and outs of using quotas. Both Windows XP Home and Professional support disk quotas, but you can only set up quotas on volumes formatted using NTFS. If you're still using the FAT file system, you must convert your drive to NTFS before employing quotas.

However, there's a twist. If you convert a volume to NTFS, all existing files on the volume are allocated to the Administrator's group. Quotas don't apply to the Administrator's group so there's no problem about the group exceeding its disk space limits, but it will throw out your space allocation calculations if your existing drive contains many files. Keep this in mind.

Note that quotas apply to volumes. A volume is an area of storage space on a drive, which you create by partitioning the drive. A drive may consist of a single volume — that's the most common scenario — or may contain multiple volumes. (A volume may even span multiple drives, but that's a realm where we need not venture.) If your computer has one drive, for example, and you partition it into three volumes, it will appear to users that it contains three drives C:, D: and E:. When you enable quotas, you must set them up individually for each volume on each drive.

There are two ways to set up quotas.

Use quota tracking. In this case, you set quota limits, but don't force users to stick to them. Sounds a little pointless, doesn't it? But it's a handy way to see who's hogging space without forcing them to run into 'disk full' messages when saving files.

Enforce quotas. When you enforce quotas, you not only set limits, you make them stick. You can set it up so that users are given a warning when they approach their quota, but once they exceed it, they won't be able to save any more files unless they do one of the following.

- Delete other files
- Move files to another volume
- Pass ownership of some files to another user.

Under XP Home Edition, this is a fairly complex process that involves starting the computer in Safe Mode and signing in under an Administrator's account to gain access to the Security tab in the File or Folder Properties dialog.

Slicing the pie

Plan ahead before you use quotas. You may be inclined to divvy up a 120G drive shared by four users into four equal 30G sections. That's not the way to go.

First, you won't have that much space to go around: system files and programs chew up a chunk of space, so what you should work on is splitting the free disk space. Also, rather than give everybody the same share, think about how people use the computer. If your son shuns the computer for everything except email and browsing the Web, he doesn't need hectares of space; while your granny will make good use of all the space you can give her for her video editing. So, if you have 100G of free space, consider breaking it up like this.

- Videophile Gran: 50G
- Games-mad Mum: 15G
- Dad the MP3-aholic: 25G

TOP TIP

If you have many volumes and want to replicate your quota settings on each drive, you can do so easily by exporting the quotas from one volume to another, using the Export option on the Quota menu in the Quota Entries window. An even easier way is to use drag and drop.

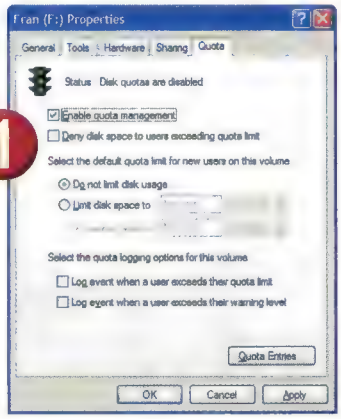
1. Right-click the volume with existing quotas, select Properties from the pop-up menu, click the Quota tab and then click the Quota Entries button to display the settings for the volume.

2. Repeat the procedure in step 1 for the volume whose quotas have not yet been set.

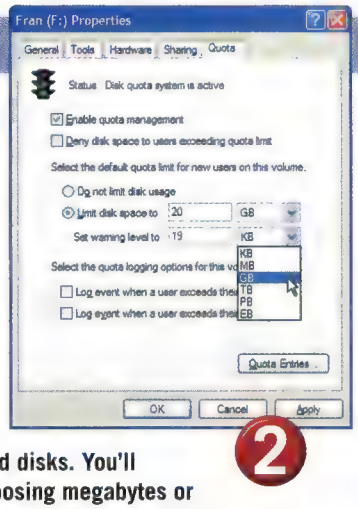
3. Drag any user's quota record from the first Quota Entries window to the second, to duplicate the settings.

STEP BY STEP: ENABLING QUOTAS

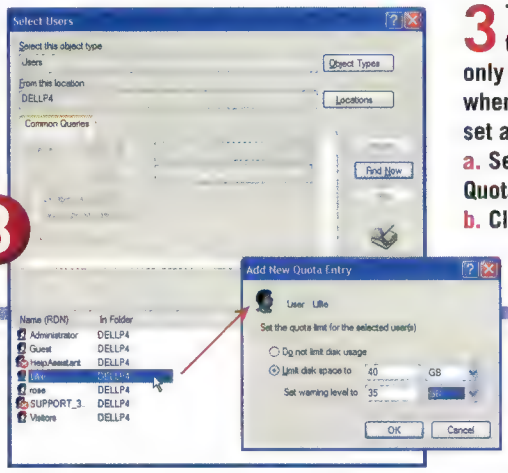
1 **a.** Open My Computer, right-click the volume you wish to use and select Properties from the pop-up menu.
b. Click the Quota tab in the Properties dialog.
c. Tick 'Enable quota management'.
d. To use quota tracking, leave 'Deny disk space to users exceeding quota limit' unticked. To enforce quotas, tick this setting.
Warning: it's wise to leave this setting disabled on the C: drive (or on whichever drive you have installed Windows). Because Windows writes information on the system partition during startup, if you enforce quotas on a system drive, you may find yourself unable to start Windows.



2 If you want to set a default quota for all users:
a. Click 'Limit disk space to' and select a size limit (you can adjust quotas for individual users later). Note how delightfully forward thinking Microsoft has been in allowing for terabyte (TB), petabyte (PB) and exabyte (EB) sized disks. You'll probably be stuck with choosing megabytes or gigabytes (selecting kilobytes makes no sense).
b. Select a warning level a little below the disk space limit, so users know when they're approaching their limit.
c. Select any logging options you want to track usage.



3 To adjust individual quotas, click the Quota Entries button. You'll see only the Administrator's group listed when you first open this window. To set a quota for an individual:
a. Select 'New quota entry' from the Quota menu.
b. Click the Advanced button, make sure Users is displayed in the 'Select this object type' box, then click Find Now. A list of all users (including disabled accounts) will be displayed.
c. Click the user's name in the list and click OK twice to display the 'Add new quota entry' dialog box.
d. Click 'Limit disk space to' and set a quota and warning level, then click OK. Repeat this procedure to set quotas for other users.



- Jack's email and Web pages: 5G
- Guest account: 5G

One last thing: deleting an existing user's quota setting is an absurdly tedious process, so don't implement quotas unless you really need them.

File ownership

File ownership is central to Windows' management of file quotas, but it's not the sort of thing that comes across most users' radar. Still, if you'd like to know more about the ins and outs of disk quotas and how to manage them, you will need to get acquainted with file ownership.

To keep track of who owns which files on a computer, Windows tags each file with a security identifier (SID), identifying the owner. Each computer running XP and each user of that computer is assigned a unique SID.

You can take a look at all SIDs assigned on your machine by using the Registry Editor to view the keys contained within HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Profile List:

The ProfileImagePath contains a portion of the username, which will help you identify the user. Make sure you don't alter anything within this key.

File ownership is one of those finicky details which Microsoft hides from Windows XP Home Edition users. If you want to discover the owner of a particular file, you'll first have to reboot in Safe Mode and log in as an Administrator.

1. Right-click the file and select Properties from the pop-up menu.
2. Click the Security tab, then click the Advanced button to open the Advanced Security Settings dialog.
3. Click the Owner tab to see who 'owns' the file. On this tab, you can also reassign ownership to another user with sufficient security permissions.

Because disk quotas are based on file ownership, relocating a file on a volume will have no effect on a user's quota. However, copying a file will increase the user's disk usage, as the file ownership information is copied along with the file.

If a user has consumed almost their entire disk quota and has deleted all unnecessary files, they can gain a little wriggle room by getting another user — most likely an Administrator — to claim ownership of some of their files. PCU

Tweaking Windows' startup

Rose Vines

speeds up the Windows startup routine.

Instant Windows has long been a goal of Microsoft. The idea is to make computers as responsive as TVs: press the power switch and bingo!, there's Windows in all its glory. Well, we don't have instant Windows in the latest version, XP, and we certainly don't have it in Windows 98 or Me. If Windows is ready and waiting within a minute of applying juice to your system, you're doing very well indeed. Even getting to the Windows startup graphic often takes 30 seconds or more. So, what's the delay?

The startup process

When you switch on your computer, it goes through a lengthy series of tasks before it even thinks about loading Windows.

1. The Power-On Self Test (POST) is the first thing to run. It consists of a set of routines stored in nonvolatile read-only memory (ROM). The POST checks that necessary components are present, such as the keyboard and disk drives; determines the amount of RAM available; and performs some basic hardware tests.
2. If the POST is successful, control passes to the ROM-based bootstrap loader — so called because it 'pulls the system up by its own bootstraps'.
3. The bootstrap loader in turn loads a more substantial loader program from disk, which then loads the operating system. In this case, the operating system is not Windows but the real-mode operating system, DOS, contained in a file called io.sys.
4. The io.sys file initialises low-level DOS functions, runs a number of DOS programs, and checks configuration information contained in the file msdos.sys, as well as config.sys and autoexec.bat, if present. While the latter two files have largely been superseded in Windows 98 and Me, required only if you need to load real-mode drivers for older hardware or programs, msdos.sys contains important configuration information that affects how the rest of the startup proceeds. Once it has done all this, as its final task, io.sys loads the protected-mode operating system, Windows.

REAL AND PROTECTED MODES

Real mode is a single-tasking operating mode that replicates the memory management of early Intel chips, providing backward compatibility with DOS. Protected mode provides multitasking support and advanced memory management. Concurrently running programs are 'protected' from one another by being assigned separate sections of memory, thus avoiding conflicts that cause crashes.

Setting	Values (default shown after comma)	Description
AutoScan	0 to 2, 2	Run ScanDisk at bootup
BootFailSafe	Boolean, 0	Boot automatically into Safe Mode
BootGUI	Boolean, 1	Load the GUI (Windows) interface
BootKeys	Boolean, 1	Permit function key options during boot
BootMenu	Boolean, 0	Display the Startup menu automatically
BootMenuDefault	n, 1 or 3 or 4	Choose default Startup menu selection
BootMenuDelay	n, 30	Set time Startup menu is displayed
BootMulti	Boolean, 0	Allow boot to previous operating system
BootWarn	Boolean, 1	Display message when booting in Safe Mode
BootWin	Boolean, 1	Load Windows 98
DoubleBuffer	Boolean, 0	Provide double-buffering for SCSI and other devices
DrvSpace	Boolean, 1	Load driver for compressed drives
LoadTop	Boolean, 1	Load command.com and DriveSpace at top of conventional memory
Logo	Boolean, 1	Display Windows logo during startup

Unnecessary startup files

Although this startup routine usually occurs on autopilot, there are things you can do to alter its course or to speed it up. A good starting point is to eliminate autoexec.bat and config.sys, unless you really need them. Some older hardware and programs need these two files, but for most of us, they're unnecessary.

If you're not sure whether you need them, make a backup copy of each file — call them something like autoexec.old and config.old — then delete the originals and reboot into Windows.

Spend some time trying out all your regular programs, including DOS-based games you play from within Windows, antivirus software and programs that use unusual peripherals such as scanners. If all these appear to work, you can probably safely do without autoexec.bat and config.sys. If not, rename the OLD backups to their original names.

In fact, even if you eliminate autoexec.bat and config.sys, their ghosts live on. That's because many of the commands that once used to appear in these two files have now been tucked away into io.sys. Unlike autoexec.bat, config.sys and msdos.sys, io.sys is not editable.

However, lurking under its surface are a group of commands that will be familiar to anyone who grew up with DOS. Commands from config.sys automatically set in io.sys are:

```
dos=high
device=himem.sys
device=ifshlp.sys
device=setver.exe
shell=command.com /p
files=60
lastdrive=z
buffers=30
stacks=9,256
FCBS=4
```

Those last five commands aren't needed under Windows, but are there for compatibility. Commands from autoexec.bat automatically set in io.sys are:

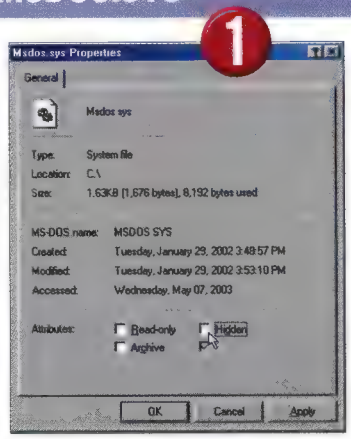
```
tmp=c:\windows\temp
temp=c:\windows\temp
prompt=$p$g
path=c:\windows; c:\windows\command
comspec=c:\windows\command\
command.com
```

If you use an autoexec.bat or config.sys file, the settings in those files override the io.sys defaults.

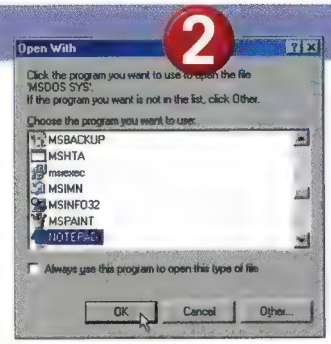
STEP BY STEP: EDITING MSDOS.SYS

1 The msdos.sys file hides out in the root folder of your boot drive, which is usually C:\. I say 'hides out' because Microsoft marks it as a hidden, read-only file to keep it safe from prying fingers. Of course, we want to pry. Here's how to do so safely.

- Make sure you've set Explorer to display hidden files. If you haven't, double-click My Computer, select Folder Options from the View menu, click the View tab, select Show All Files in the Hidden Files section and click OK.
- If you don't have My Computer open yet, open it up then double-click the C: drive (assuming that's your boot drive).
- Locate msdos.sys, hold down the Ctrl key and drag the file into a vacant spot in the same window to create a copy. You can always revert to this copy if you make a mess of things.
- Now right-click the original msdos.sys file and select Properties from the pop-up menu.
- Remove the ticks beside Read-only and Hidden in the Attributes section and click OK.



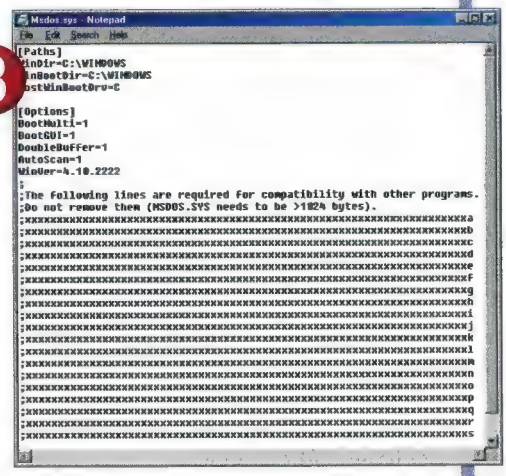
2 Now you're all set to edit the file. Right-click it, select Open With from the pop-up menu, select Notepad from the list of programs, and click OK.



3 You'll see something that resembles the accompanying screenshot. The [Paths] section settings precede the [Options] settings, with each setting on a separate line. Lines beginning with a semicolon are comments and are ignored by Windows.

There's one glaring oddity about the file, and that's the series of lines containing Xes. Those extra characters are included because some programs, such as antivirus software, check to ensure msdos.sys is at least 1,024 characters in length. So, it's important that you keep these extra characters intact. It's also important you don't delete msdos.sys, or your computer will not start.

Make changes by adjusting the existing settings in the [Options] section or by adding new settings, one setting per line. Once you've finished making your changes, save the file, re-enable its Hidden and Read-only settings as you did in step 1, and reboot your computer to have the new settings come into effect.



Tweaking msdos.sys

You can gain more control over the startup process by fiddling with msdos.sys. This configuration file determines whether Windows should be loaded at all or whether you should boot into DOS, it controls ScanDisk behaviour, handles the display of the Startup menu, and much more.

The file msdos.sys is a text file (unlike its predecessor under DOS) containing two sections: a Paths section, pointing to the locations of important Windows folders, and an Options section that you can personalise the bootup process with.

The Paths section is created for you during Windows setup. The Options section is the interesting one. The table on the page opposite shows the most important options. Let's take a look at a few of the more useful ones in detail.

Boolean settings can have a value of 0 (disabled) or 1 (enabled). Any option not explicitly contained in msdos.sys reverts to the default setting.

AutoScan. By default, you are prompted to run ScanDisk after an improper shutdown. Set AutoScan=0 to avoid ScanDisk; set AutoScan=2 to run ScanDisk without the prompt.

BootKeys. During bootup, you can use function keys such as F8 to display the Startup menu and F5 to start Windows in Safe Mode. Setting BootKeys=0 disables access to these function keys, which may be useful for security reasons.

BootFailSafe. Set BootFailSafe=1 to force your computer to start in Safe Mode.

BootMenuDefault. The Startup menu allows you to pick the type of system startup to be performed. The options displayed in the Startup menu are dependent on your system configuration. The default is 1 (Normal) if the system is running correctly; 3 (Safe Mode) after a system crash on a standalone PC; and 4 (Safe Modem With Network Support) after a crash on a networked PC. Use this option to pick your preferred default selection.

BootWin. BootWin=1, the default, loads Windows at the end of the real-mode boot process. Set BootWin=0 to load your previous operating system instead (if you have kept a copy of DOS on your system).

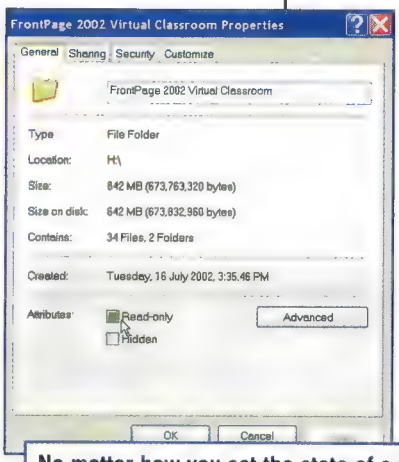
BootMulti. Set BootMulti=0 to disable booting into a previous operating system.

Logo. Set Logo=0 to prevent the display of the Windows logo during startup. More importantly, a setting of 0 can avoid incompatibilities with third-party memory management software. PCU

Working with read-only files

Link Harris reveals the realities of read-only files and folders.

It seems logical that setting the read-only attribute for a file would be a good way to protect it from misadventure, but unfortunately, that's not the case. The misguided logic may be a holdover from the days of DOS, where flagging a file as read-only meant just that: you could look, but not touch — well, almost. In DOS, you can't delete a file with the read-only attribute set, because if you try, the message 'access denied' displays with no option to override it. Command Prompt in Windows 2000/XP behaves in much the same way. However, with Windows it's a different story. Although My Computer displays a warning that the file you're about to delete is read-only, you can go ahead and do it anyway. A similarly wimpy warning allows you to move or rename a read-only file (which you can also do in DOS or Command Prompt).



No matter how you set the state of a folder's Read-only checkbox in Windows XP, it reverts to the green box when you open the folder's Properties sheet.

Edit me not

The only real protection a read-only attribute gives in Windows, which is also provided in DOS and Command Prompt, is to safeguard the contents of a file against editing. When you go to save a changed read-only file, you're prompted to save with a different filename and prevented from using the original. Nevertheless, anyone with a few Windows street smarts — even someone using the Guest account — can open My Computer, right-click the file, click Properties, untick Read-only, click OK and edit the contents of the original file.

Files on CDs always have the read-only attribute set. What happens to that attribute when you copy a file from a CD to your hard disk depends on the version of Windows you're using. Windows XP strips the read-only attribute, but Windows 2000 doesn't, which means a few extra steps if you want to edit a file from a CD in Windows 2000. Both versions of Windows preserve the state of the read-only attribute for other copying operations.

Read-only folder

There's a popular misconception that making a folder read-only will protect the contents of the folder. The truth is that a read-only folder in itself doesn't mean anything. However, starting with Windows Me and 2000, if you set the read-only attribute for a non-empty folder and click OK or Apply, Windows asks whether you also want to make all of the folder's files and subfolders read-only. You get a similar choice if you clear the read-only attribute for a folder.

Note that the state of the read-only attribute for a folder doesn't affect files and/or folders subsequently copied or moved into it. In addition, the state of a file's read-only attribute set via its folder's Properties sheet won't change if you copy or move the file from that folder. If you add files to a folder and want the state of their read-only attributes to be the same as the other files in that folder, you have two choices in Windows 2000. You can open the folder's Properties sheet, change the state of the read-only attribute and click Apply, then change the state back and click OK. Alternatively, you can set the attribute individually for each new file.

In an apparent attempt to enhance user friendliness, Windows XP has introduced an undocumented tristate checkbox for a folder's read-only attribute. When you open a folder's Properties sheet, the Read-only box shows a green square, which represents an indeterminate state. Clicking the box once clears it, and clicking the box a second time displays a tick. Unlike other versions of Windows, if you click OK or Apply when the box is ticked, this doesn't set the read-only attribute for the folder.

However, as with Windows Me and 2000, if you change the state of the Read-only box for a non-empty folder in XP to either clear or ticked, when you click OK or Apply, Windows asks whether you also want to apply the same state for the read-only attribute to all of that folder's files and subfolders. Note that the message is misleading, because nothing you do from My Computer will affect the state of the read-only attribute of the folder or its subfolders. Clicking OK or Apply with the green square displayed doesn't affect the state of the read-only attributes of files held in the folder or its subfolders.

NTFS permissions

If you're serious about letting other local users view the contents of a particular file, but not change it in any way, you should forget about read-only attributes and use NTFS permissions instead. To do this, the file must be stored on a drive formatted with the NTFS file system. To set NTFS permissions in Windows XP or 2000, open My Computer, right-click the file or folder and click Properties —> Security tab.

However, you won't get a Security tab in Windows XP unless you have classic file sharing enabled. To do this, click Start —> My Computer —> Tools —> Folder Options —> View tab. Scroll down the 'Advanced settings' list to the bottom, untick 'Use simple file sharing (Recommended)' and click OK. PCU

TOP TIP

Because classic file sharing isn't an option in Windows XP Home Edition, you can't get a Security tab on the Properties sheet for a file or folder on a drive formatted with the NTFS file system. However, the Security tab is available if you boot in Safe Mode and log on as a member of the Administrator's group. You can get the Windows Advanced Options Menu that includes Safe Mode by restarting your PC and pressing F8 after it finishes displaying startup messages, but before Windows starts.

Control access to directories

Last month, Les Bell set permissions for files in a Linux system. This month, he covers controlling access to directories.

Whether you use Linux in a business setting or loaded on a standalone machine at home, the operating system is a multiuser OS, and as such, it's important to keep users' files separate. Last month, we looked at how you can set permissions to control users' access to files. This month, we take a closer look at setting permissions for directories — an important step that will protect your files from access by unauthorised users.

Permissions on directories

Setting permissions to control access to files is important for the security of your data. The process is fairly straightforward, but when we look at setting permissions for directories, the process can get a little more complex, and many users have a less than perfect understanding of them.

r. The r permission allows search access to the contents of the directory, ie. the names of the files within it. This allows you, for example, to run the ls command without any arguments. It does not imply that you have access to the files in the directory — you can just read their names. Remember, a directory is simply a file; with the r permission, you are able to read the contents of that file, which is basically the filenames.

w. The w permission allows you to update the directory contents, ie. to create, rename and delete files. Notice that to delete a file, you really should have w permission on both the file itself and the directory it is in — however, technically, only w permission on the directory is required. If you do not have w permission on the file, the system will ask you if you want to override the protection on the file.

x. The x permission allows access to the directory. This allows you to cd to the directory and access any file within it by name, but not to search the directory. To search the directory, you need to be able to read its contents, which implies the r permission.

t. This refers to the sticky bit on a directory, which indicates that, despite the write permission, users cannot delete a file unless they own either the file or the directory. This allows programs to, for example, append to or update files, but not delete them.

s. With the setuid bit set on a directory (the s permission), files created in a directory will have the same ownership as the directory itself, regardless of who creates them. This is particularly useful in directories that are shared by multiple users who are all members of a group:

```
[les@freya2 les]$ ls -ld projectalpha
drwxrwsr-x   2 les      staff        4096 May 21 07:24 projectalpha
[les@freya2 les]$ cd projectalpha
[les@freya2 projectalpha]$ touch newfile; ls -l newfile
-rw-rw-r--   1 les      staff           0 May 21 07:24 newfile
```

You can see here that the projectalpha directory has the setgid (group id) permission turned on and is owned by the staff group, so that when I cd into it and create a new file (with the touch command), the file is also owned by the staff group.

g. With the setgid bit set on a directory, files created in a directory will belong to the same group as the directory does, regardless of the effective gid of the creator.

What do I need?

The table at bottom left summarises the permissions required to perform various actions on a file.

What happens when you create a file?

How are the permissions originally set? This is controlled by a variable called the umask, which specifies which permissions should be turned off. You can see your umask with the command umask -S, but in general, for a newly created file, the permissions will be set to rw-rw-rw- and then the umask value of 0002 is applied, to turn off the w permission for others, resulting in rw-rw-r--. For directories, the permissions will be rwxrwxrwx, but with the umask value subtracted, it becomes rwxrwxr-x.

You can change your umask for yourself as you work, with the umask command. As you can see, by default, your files will be readable by all users on the system. If you want to change this, you should change the umask as follows.

```
[les@freya2 les]$ umask -S
u=rwx,g=rwx,o=rx
[les@freya2 les]$ umask o=x
[les@freya2 les]$ umask -S
u=rwx,g=rwx,o=x
```

Secondary groups

The entry for each user in /etc/passwd specifies a group id for that user, which is his/her primary group, also known as a login group. By default, any files created by that user will have group ownership set to the primary group id. However, a user can also be a member of many other groups, which are referred to as secondary groups.

This is accomplished by listing the users who are members of a group in that group's entry in the >>>

In order to:	You need:	And:
Create a file	--x on all directories in the pathname	-wx on the last directory
Read a file	--x on all directories in the pathname	r-- on the file
Write to a file	--x on all directories in the pathname	-w- on the file

/etc/group file. Here is an extract.

```
c34k:x:507:amaconachie,landrews,vbell,les
```

You can see that the group c34k has four members. Users can be added to groups at the time that the users are added to the system (with the useradd command's -G option, or later with the usermod command, again, using the -G option. You can see the groups you are in with the groups command:

```
[les@freya2 les]$ groups
les c34k
```

In the Linux world, there are basically two different approaches to how users are allocated to groups.

Common group philosophy. Most Linux distributions add new users to a group called 'users', which is also the primary group for human users. This means that, by default, users' files are shared with all other users and access is controlled by the group permissions. Typically, the umask is set to 0022 or 0024, so that members of your primary group can read but not write files you create, while world (other users) cannot write and perhaps not read them.

Red Hat's user private group philosophy. On Red Hat Linux, when a new user is created, a group of the same name is also created, and that group is the user's primary group. This means that, by default, users only have access to each others' files by virtue of the 'other' or 'world' permissions. However, if you want to allow co-workers access to your files, all you have to do is add those users to your group. With the default umask value of 0002, files that you create will be writable by other members of your group. One little convenience of the Red Hat scheme is that groups will often need a directory where they can share files, and creating a user with the desired group name has the effect of creating the group and also creating a home directory for that group.

In practice

You now have all the tools required to secure the files you want to keep private, while sharing files between different groups of users. In a home setting, you could use Red Hat with its private group scheme to let each family member keep their private files truly private, while creating a secondary group for kids, with a shared directory that lets the kids share their files and the setgid bit turned on so that files created there are owned by the group 'kids'. Another similarly configured directory can be used to share all family photographs, shared documents, and so on. And with these directories shared by Samba, all family members will be able to get the appropriate access from their Windows desktop PCs, if that's what they use.

Similarly, in an office setting, groups can be set up on a departmental basis to allow shared access to files, with other departments denied access.

The Linux access control mechanism is simple, but effective, and an understanding of it can keep your information secure, while allowing easy sharing where necessary. PCU

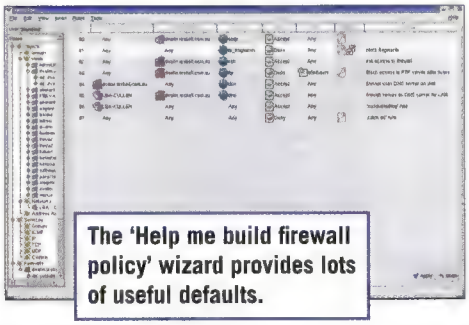
LINUX DOWNLOAD OF THE MONTH

ON THE CD

Firewall Builder

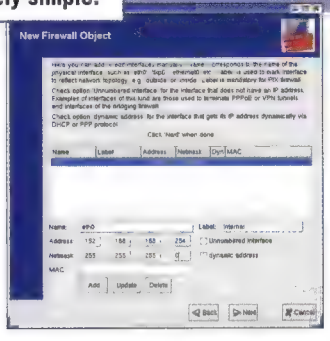
Price: free **Web:** www.fwbuilder.org

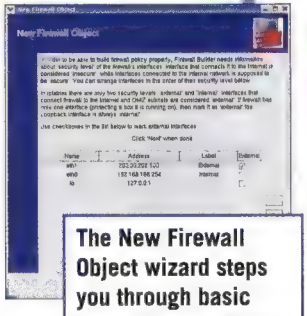
Firewall Builder is a really powerful utility for those who are building firewalls. The program is a graphical tool for setting up and maintaining complex firewall rules scripts, for either filtering routers that protect networks, or for bastion hosts that must defend themselves.



The 'Help me build firewall policy' wizard provides lots of useful defaults.

Adding interfaces to a firewall (or host) is extremely simple.





The New Firewall Object wizard steps you through basic firewall configuration.

Although Firewall Builder runs on Linux, it does not assume the firewall itself is running on Linux; it can write rules for Linux's iptables command, FreeBSD's ipfilter, OpenBSD's pf, and even Cisco PIX firewalls (remember to download the appropriate modules). To start using fwbuilder, run it (the command is fwbuilder), then start creating objects with the 'Insert' menu option. You can create networks, individual hosts and firewalls, and then drag and drop objects (representing protocols, services, times of day) into the Policy object of a firewall in order to create filtering rules.

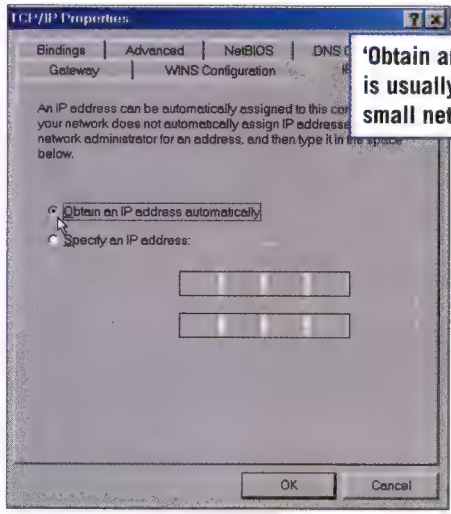
Firewall Builder has some interesting capabilities, such as the ability to read zone files from a DNS to create host objects, or to perform network discovery using SNMP. The latter capability is of dubious value, however, since there are so many well-known weaknesses in SNMP (see CERT Advisory CA-2002-03), most firewall administrators won't allow it on their systems. The program also has a wizard (Rules —> Help me build firewall policy), which steps the novice through basic firewall policy construction.

Once you have defined a firewall policy and saved it, clicking Rules —> Compile will generate a firewall script, which will be saved in the current directory, as *firewall-name*.fw. This can then be transferred to the firewall machine for execution (actually, fwbuilder can automatically invoke a script to install the firewall script).

You still need to have a good understanding of firewall principles and network protocols, but Firewall Builder makes the construction of complex policies much, much easier.

You will need to download different files, depending on which Linux distribution you are running. For Red Hat 9, get libfwbuilder-1.0.0-1.rh9.i386.rpm, fwbuilder-1.0.10-1.rh9.i386.rpm and fwbuilder-ipt-1.0.10-1.rh9.i386.rpm, but you will also need libsigc++10-1.0.4-fr3.i386.rpm and gtkmm-1.2.10.fr3.i386.rpm, which can be downloaded from http://freshrpms.net/.

TCP/IP basics



'Obtain an IP address automatically' is usually the best bet for PCs in small networks (Windows 98 shown).

In the first part of a new series, Link Harris explains the essentials of TCP/IP.

If you want to troubleshoot your network effectively, you must know something about TCP/IP. In this tutorial, we begin our examination of what TCP/IP is, how it works and how it's configured. Future tutorials will cover more of the essentials, what can go wrong and how to fix the problems.

What is TCP/IP?

A network protocol is a set of rules for the way computers talk to each other. TCP/IP is the most common protocol used for both large and small Windows networks and is the only one your PC can use on the Internet. TCP/IP, which stands for Transmission Control Protocol/Internet Protocol, was developed in the 1960s for ARPAnet, the forerunner of the Internet.

The ARPA in ARPAnet is an acronym for the Advanced Research Project Agency, an arm of the United States Department of Defense. The new network technology it commissioned had to tolerate lost data, missing links and dodgy connections, and was initially used to interconnect several major US government agencies, defence contractors and universities.

For TCP/IP to route data packets properly, each PC on a Windows LAN needs an IP address, a subnet mask and possibly a default gateway. In addition, if your PC is connected directly to the Internet, you'll need to specify one or more domain name system (DNS) servers.

IP address

The IP address identifies both the PC and its local network. The address consists of a 32-bit number represented as four eight-bit blocks, separated by full stops. Each block is in decimal (base 10) format and can range from 0 to 255. 192.168.2.16, 172.16.254.77 and 10.0.1.1 are all valid IP addresses.

Although each of the four numbers in an IP address doesn't signify anything in particular, each PC on a local network must have a unique IP address.

In addition, there are restrictions on which numbers you can use, which we'll discuss next month.

Subnet mask

TCP/IP was designed for large networks that are divided into two or more subnetworks for logical or managerial reasons. For instance, a network for a large organisation might have a separate subnetwork for each department, or the network for a company with branches in several locations might have a separate subnetwork for each location. A subnetwork can be further divided into subnetworks.

The initial part of an IP address is used to identify the network (or subnetwork) and the remaining part is used to identify the PC. The subnet mask, which has the same format as an IP address, tells TCP/IP which is which, and identifies whether the PC is on the local subnetwork or a remote network.

The decimal blocks in a subnet mask usually convert to binary blocks with all 1s on the left and all 0s on the right.

The most common decimal blocks are either 255, which corresponds to binary 11111111; or decimal 0, which corresponds to binary 00000000. The blocks of 255 come first, followed by the blocks of 0, such as 255.255.0.0 or 255.255.255.0. Two other common subnet masks are 255.255.255.192 (192 is binary 11000000) and 255.255.255.224 (224 is binary 11100000).

When an IP address is 'masked' by a subnet mask, blocks of binary 1s preserve the corresponding part of the IP address, while blocks of binary 0s change the corresponding IP block to 0. The result is the network address.

The PC's address is the remaining part of the original IP address that was masked to 0 by the subnet mask.

For instance, for an IP address of 192.168.2.16 and a subnet mask of 255.255.255.0, the network address is 192.168.2.0 and the PC's address is 0.0.0.16. If the subnet mask were 255.255.0.0, the network address would be 192.168.0.0 and the PC's address would be 0.0.2.16.

This illustrates why it's essential for all PCs on the same subnetwork (or network, in the case of a small network with no subnetworks) must have the same subnet mask.

If one PC had a different subnet mask, this would tell TCP/IP the PC is on a different network and it wouldn't be able to talk to the other PCs. >>>

TOP TIP

The path to inspect and/or adjust TCP/IP settings depends on the operating system.

Windows 9x/Me. Right-click Network Neighborhood and click Properties. Select 'TCP/IP —> *network card*' from the list on the Configuration tab and click the Properties button. In Windows Me, replace Network Neighborhood with My Network Places.

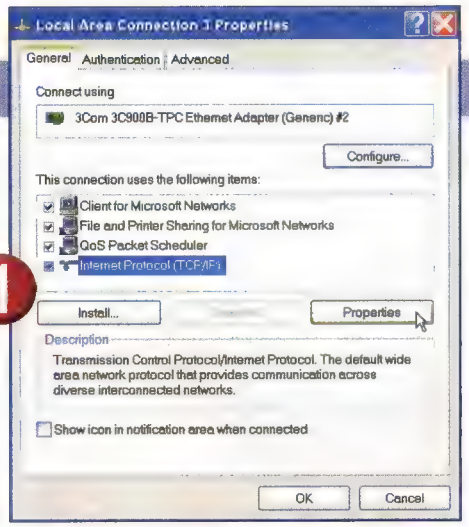
Windows 2000/XP. Right-click My Network Places and click Properties. Select your LAN and click Properties. Select 'Internet Protocol (TCP/IP)' from the list and click the Properties button. In XP, you can get to My Network Places from the Start menu.

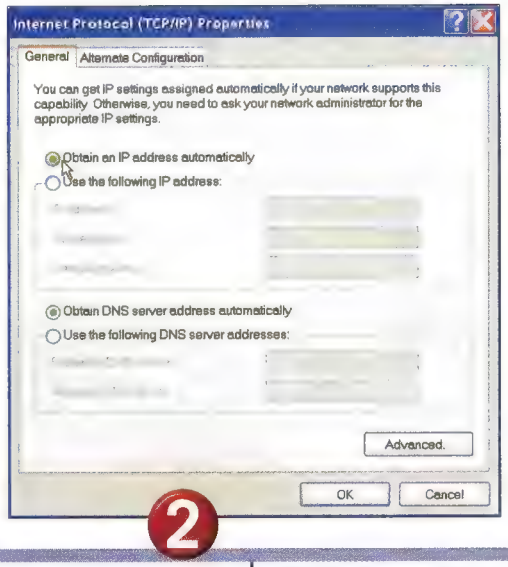
Windows NT 4.0. Right-click Network Neighborhood and click Properties —> Protocols tab. Select 'TCP/IP Protocol' from the list and click the Properties button.

STEP BY STEP: ALTERNATE TCP/IP CONFIGURATION

Windows XP allows you to specify a fixed fallback IP configuration as an alternative to APIPA when a DHCP server is unavailable. This is useful for portable PCs that regularly connect to different networks.

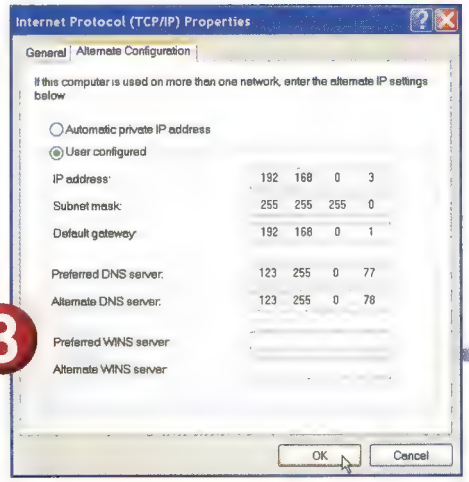
1 Click Start, right-click My Network Places and click Properties. Right-click your LAN and click Properties. Select 'Internet Protocol (TCP/IP)' in the 'This connection uses the following items' window and click the Properties button.





2 On the General tab, click 'Obtain an IP address automatically' (if that's not already selected). This causes the Alternate Configuration tab to appear.

3 Click the Alternate Configuration tab and click 'User configured'. Type in entries for 'IP address' and 'Subnet mask', and the 'Default gateway' and 'DNS server(s)', if necessary. Ignore the 'WINS server' fields, which are only relevant for large networks that use domains. Then click OK.



Assigning IP addresses

Windows offers several options for assigning a PC's IP address.

DHCP. The simplest and most effective way for your PC to obtain its IP address is from a Dynamic Host Configuration Protocol (DHCP) server. This is the default configuration for all versions of Windows except NT, which can obtain its IP address from a DHCP server, but defaults to a static IP address. Most ISPs use a DHCP server to automatically assign an IP address when you dial in.

A DHCP server makes IT managers' jobs much easier. Once they configure TCP/IP settings on that machine, they can forget about TCP/IP for all of the clients on the network, because the DHCP server configures not only their IP address, but all of their TCP/IP settings. Unix supports DHPC service, as do all Windows Server products starting with NT Server 4.0. Windows 98SE/Me/XP and 2000 Professional with ICS enabled offer a bare-bones DHCP service that uses a subnet mask of 255.255.255.0.

When a Windows PC configured to obtain its IP address from a DHPC server first starts, it broadcasts a message on the network: 'Yo! Who am I?'. This is called a DHCP 'discover' message, and if a DHCP server doesn't respond, the discover message is repeated several times. If there's still no response, Windows resorts to Automatic Private IP Addressing (APIPA).

APIPA. Windows 98/Me/2000/XP all offer this fallback automatic IP addressing scheme. If there's no response after sending several DHCP discover messages, the PC randomly assigns an IP address in the range 169.254.0.1 to 169.254.255.254 with subnet mask of 255.255.0.0. Then the PC broadcasts a message on the network, asking whether any other PC is using that particular IP address.

With a choice of over 64,000 different addresses, the chances of a duplication are low. Nevertheless, if there's an affirmative reply the PC tries another random address in that range and repeats the query until it finds an IP address that's not being used by another PC. APIPA only assigns an IP address and subnet mask, which is fine for a simple network with no outside connections.

After settling on an APIPA address, the PC is supposed to continue sending DHCP discover messages every three minutes. The theory is that if a DHCP server comes online (for example, say you boot the PC that's the ICS host), that server will fully reconfigure the APIPA PC's TCP/IP. However, in my experience, this isn't reliable and I usually end up rebooting all of the clients after the DHCP server has started.

Static IP address. You can create a fixed TCP/IP configuration by typing in a PC's IP address, subnet mask and other TCP/IP details. Although I advise against doing this for small networks, it's essential if your PC is a Web server, mail server or gateway for a Virtual Private Network (VPN). PCU

Indexing a Word document

Helen Bradley shows how to create an index and use it to find information in long Word documents.

Often, the finishing touches you put to a document consume as much time as it took to put the document together in the first place. It's not that these tasks are particularly difficult, but rather that they are fiddly. One such task is creating an index for the back of a book which contains a list of topics and the number of the page each appears on. Most documents of a few pages or more will require an index and Microsoft Word, like most word processing packages, has tools that can help you create one.

We used Word 2002 for this column, but the techniques we'll show you have been around for many versions. You may find some of the menu options have moved, but the basics are unaltered.

How an index is created

Word's process for creating an index is to mark each piece of text that you want to include in the index, set up the options and then create the index. The last two tasks involve a few mouseclicks and the first one is the one that takes all the time. When you mark your text, you must locate each item to appear in the index; for example, if you're preparing a document about holiday places on the Gold Coast, you'll need to select each time 'Gold Coast' appears and mark each text entry for inclusion in the index. If you multiply this by all the other items to appear in the index, you can see just how big a job it could be.

A simple example

To see how the basics of an index work, open a simple document of a few pages and identify a few words that occur repeatedly throughout the text to include in your index.

To mark an entry, select the text then press Alt-Shift-X (or click Insert —> Reference —> Index and Tables —> Index tab —> Mark Entry). This opens the Mark Index Entry dialog. Edit the text in the Main entry option if desired. As this entry becomes the actual entry that appears in the index, you may want to capitalise it or edit it appropriately, but changes to this won't affect the text in your document. When you're done, click OK to add the entry. The dialog will stay open, so you can continue to mark other entries without having to open it each time.

If you display field codes (Show/Hide) you will see that the text has been marked with a field code, which looks like this: {**XE "Gold Coast"**}. The **XE** is the identifier for an Index Entry field code and the **Gold Coast** is the main heading you've created.

You can also create a subentry of an existing entry; for example, Restaurants and Resort Hotels are typical subentries for the Gold Coast index entry. To do this, type the Main entry (**Gold Coast**) and then the relevant Subentry: **Restaurants**. You can also do this by typing **Gold Coast: Restaurants** in the Main entry area — it might be a little quicker this way. The index field code for a subentry looks like this: {**XE "Gold Coast:Restaurants"**}.

If you have an item like Gold Coast and you want to mark every instance of the words Gold Coast in your text, you can get Word to do this if you select one instance of the words Gold Coast, then set up the Mark Index Entry dialog as you would for a single index entry. Instead of clicking Mark, click Mark All.

To create the index, position your insertion point where the index should appear, then click Insert —> Reference —> Index and Tables —> Index tab. Choose an index format from the Formats drop-down list. Choose whether page numbers should appear beside the items or on the right of the page, whether they should be indented or run in, and the number of columns to use for the index. The Preview window shows you how the index will look when completed. When you're done, click OK to create the index.

Updating an index

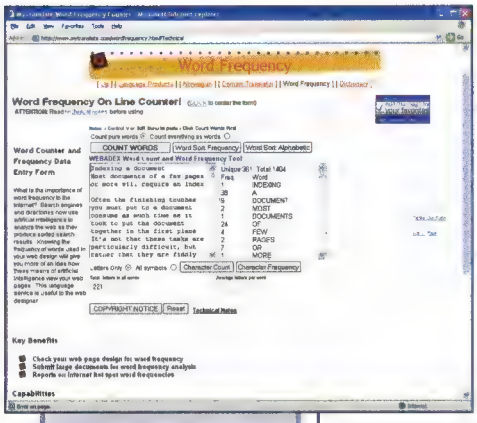
Once you've created an index, the items you've marked remain marked in your document so you don't lose your work. If you find you've included something you didn't want to or omitted something, you can go back and either remove the field code to remove the index marker, or select another piece of text and mark it as you did the other entries. To remove a field code, click the Show/Hide button on the toolbar to display field codes, select the one to remove and press Delete. Pressing Show/Hide again will hide the field code display.

When you're done making your changes, click Insert —> Reference —> Index and Tables —> Index tab, check that the settings are the way you want them, and click OK. Word will indicate if it finds a previous version of the index and will ask if you want to replace it. Answer Yes and it will be replaced with the updated version.

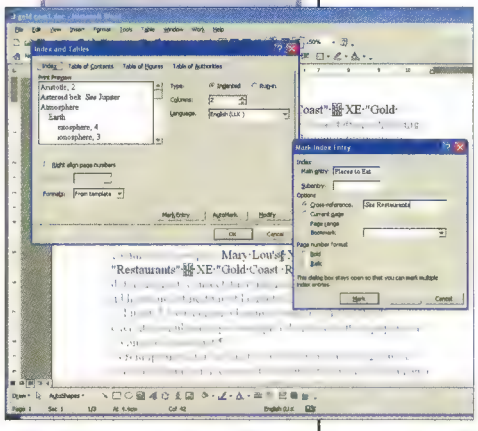
Using a concordance file

As you can see, the process of marking entries for inclusion in an index can be very time consuming. However, there's a tool you can use to help speed up the process — it's called a concordance file. A concordance file is a list of words, every occurrence of which you want to mark to include in the index. You include in the concordance file both the words you want to index and the index entry they're to be associated with.

Using a concordance file speeds up a large part of the work involved in creating an index, but it doesn't eliminate manual marking. For it to be valuable, plan its creation carefully. As every occurrence of a word you enter in the concordance file will >>>



Sites like this one can take pages of text and return a list of the words and their frequencies.



You can create cross-references for any item whether it is in your text or not.

«««

be indexed, only type words for which every occurrence should be indexed. In our holidays on the Gold Coast example, you would index Mary Lou's Restaurant wherever it appears, but you wouldn't index the word 'restaurant' every time, although you may index it occasionally where necessary. The first instance is a good entry for a concordance file, and the second will require manual marking.

Other index features

You can apply rudimentary formatting to your index using the Mark Index Entry dialog. Choose Bold or Italics to apply this to the page number as it will appear in the index. You can also apply a format to the actual entry in the index by selecting the text in the Main Entry area and pressing Ctrl-B to make it bold, Ctrl-I to make it italic, or Ctrl-U for underlined.

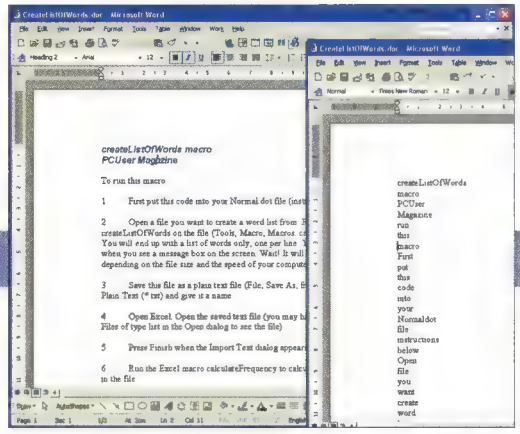
For entries in the index that should be cross-referenced rather than have page numbers associated with them, use the Cross-Reference option. For example, use it if you want to cross-reference 'Places to eat' to 'Restaurants', so anyone looking up 'Places to eat' in the index would be referred to the Restaurants section. To do this, position your cursor anywhere in your text (but don't highlight a word), then press Shift-Alt-X. Type the text to be referenced, for example, **Places to Eat**, then click the Cross-Reference option. After the word See, type the cross-reference text, such as **Restaurants** and click OK. Not only is this a way to create a cross-reference, but you can apply the concept of placing your cursor in the text (but not highlighting any text) to add items to the index which aren't linked to any text, but which appear on that page.

Creating a word list

There are a few ways you can create a word list to use as a concordance file and these involve isolating unique words in the text and then looking at them and their relative frequency to determine the advisability or otherwise of including them in your index.

One handy online solution can be found at **www.mytranslate.com/wordfrequency.htm#Technical**. Although we repeatedly encountered errors on this site when used with Internet Explorer 6, it nevertheless produced the result we were looking for when we pasted text into the pane on the left of the page and clicked the Count Words button. The result is a list of words and their frequencies, which appears in the column on the right. You can then select this and copy it into another Word document and use it as the basis for a concordance document.

Another solution is the free program called Wurdz, which you will find at: **http://adwt.com/pc/wurdz.htm**. Download and install it and then run the program. It can open text files, so you can save a duplicate of your Word file using the TXT format by clicking File —> Save As and selecting 'Plain text (*.txt)' from the 'Save as type' list, then click Windows Default and OK. Use this as the file to import into Wurdz. You can also copy and paste text into the dialog from your Word document. Click Analyze Text



On the left is a text document and on the right is the list of words from the document created by the Word macro. Take this to Excel and run this month's macro on it, and you'll get the frequencies of each.

MACROS OF THE MONTH

This month's macros allow you to create your own word frequency list from any Word document. The file CreateAWordList.doc contains a macro that converts any regular Word file to a list of words, one per line. It does this by stripping punctuation, all instances of the word 'the' and all numbers from the text, and then formats it so there is one word per line. It also removes all words that are two characters or less in length. If you take the output from this process and save it to disk as a text file, you will have a list of words that are in your document.

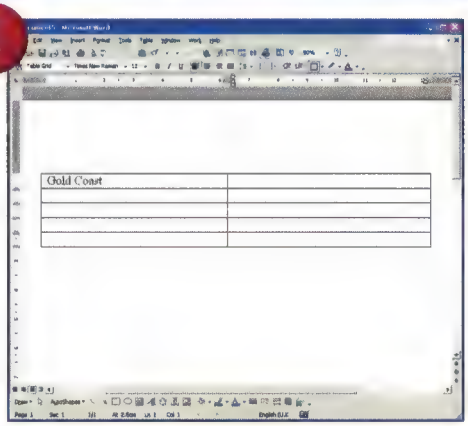
The Excel macro of the month (wordfrequency.xls), can take this word list and compile a frequency list from this. The macro expects the list of words to appear in column A, which is where they will be if you open a text file and immediately press Finish in the Text Import Wizard's first step to accept the default settings. The macro then extracts a copy of the list of words in column A (taking unique words only), places them in column C, and sorts them alphabetically for neatness. It then uses this list of words in a series of formulas in column D to calculate the frequency with which each word in column C appears in the list in column A. The formula in cell D1 is simply **=COUNTIF(A:A,C1)** and is placed in one cell by the macro and then copied down column D using a routine that first selects all cells opposite the filled cells in column C, then copies the contents of cell D1 to them. The final result is an alphabetical list of the words in your document and the frequency with which they appear.

The Word macro is customisable in that you can add other characters to be stripped from the document as required. While the programs in this month's indexing article work faster, these examples show one method by which the process can be coded using VBA and the power of Word and Excel.

ON THE CD

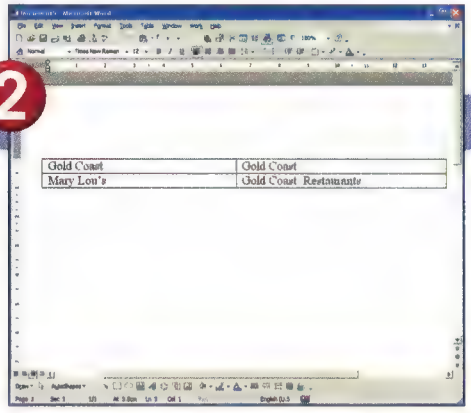
STEP BY STEP: USING A CONCORDANCE FILE

A concordance file provides a way of speeding up marking text entries for your index.



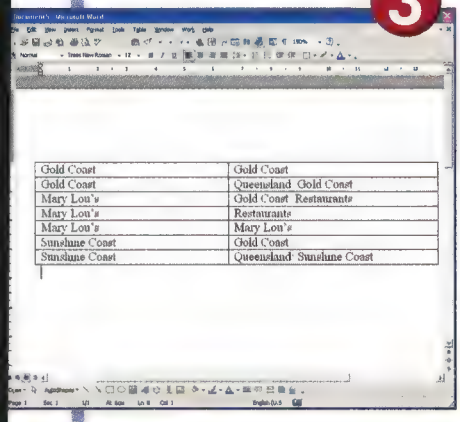
Gold Coast	

1 Open a new Word document and add a table (use Insert —> Insert Table) that is two columns wide and at least two rows deep. In the left column type, the words you want to add to the index. For a story on holidays on the Gold Coast, type Gold Coast, for example.

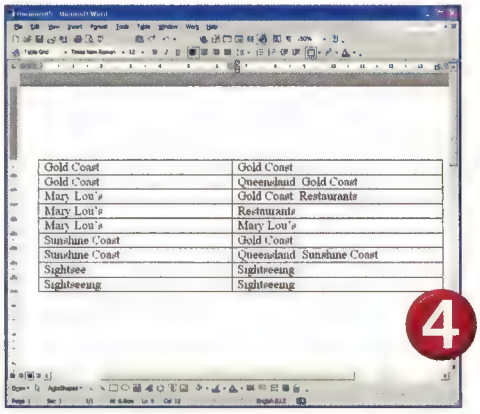


Gold Coast	Gold Coast
Mary Lou's	Gold Coast Restaurants

2 In the right-hand column, type the index entry for this text. In our example, Gold Coast will be a main entry so it is included as Gold Coast. Other items like Mary Lou's will be added as Gold Coast: Restaurants, as this will be included as a subindex item.



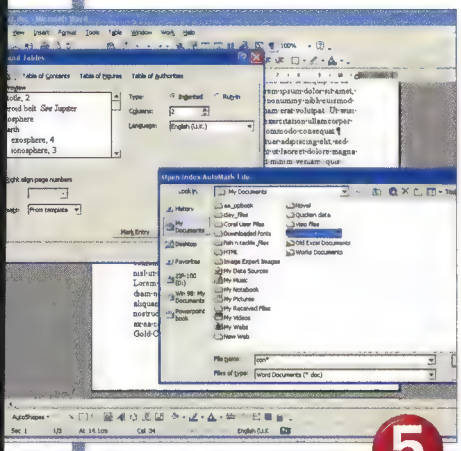
Gold Coast	Gold Coast
Gold Coast	Queensland Gold Coast
Mary Lou's	Gold Coast Restaurants
Mary Lou's	Restaurants
Mary Lou's	Mary Lou's
Sunshine Coast	Gold Coast
Sunshine Coast	Queensland Sunshine Coast

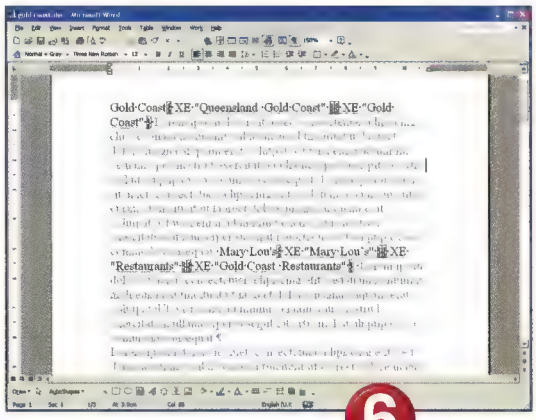


Gold Coast	Gold Coast
Gold Coast	Queensland Gold Coast
Mary Lou's	Gold Coast Restaurants
Mary Lou's	Restaurants
Mary Lou's	Mary Lou's
Sunshine Coast	Gold Coast
Sunshine Coast	Queensland Sunshine Coast
Sightsee	Sightseeing
Sightseeing	Sightseeing

3 For items that should be included as multiple index entires, for example, Mary Lou's restaurant will be included in Gold Coast: Restaurants, in Restaurants and also as Mary Lou's, you'll need three separate entries, all in different rows of the table.

4 For words that have multiple forms, such as 'sightsee' and 'sightseeing', you will need to include separate entries for each and index entries for each (even if they will be included in the same index entry as shown here).



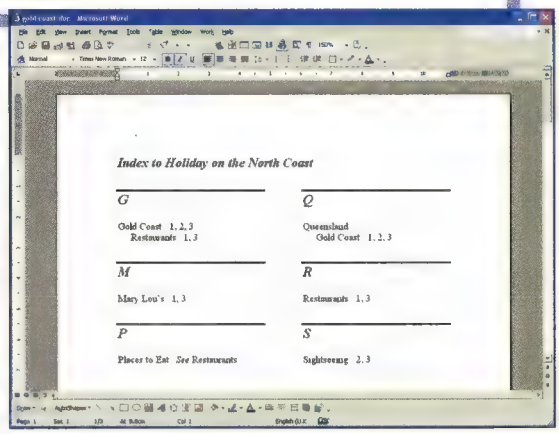


Gold·Coast{XE·"Queensland·Gold·Coast"}{XE·"Gold·Coast"}

·Mary·Lou's{XE·"Mary·Lou's"}{XE·"Restaurants"}{XE·"Gold·Coast·Restaurants"}

5 When you're done, save and close your concordance file and open the file that contains the text you want to index. Click Insert —> Reference —> Index and Tables—> Index tab and click AutoMark. This displays the Open Index AutoMark File dialog.

6 Select your concordance file and click Open. Word will look for every instance of a word in the first column of the concordance file table and mark it with the entry from the right-hand column, so your index field codes will be created automatically.



Index to Holiday on the North Coast

G
Gold Coast 1, 2, 3
Restaurants 1, 3

M
Mary Lou's 1, 3

P
Places to Eat *See* Restaurants

Q
Queensland
Gold Coast 1, 2, 3

R
Restaurants 1, 3

S
Sightseeing 2, 3

to analyse it, and you will get a list of words and their frequencies. To save this, click File —> Save and type a name for the text file. You can then open it in Word to use to create a concordance file.

To create a concordance file from your word list, first remove all the words you don't want to use. If your list contains the number of times a word appears, you can remove these frequencies by stripping out the numbers. Use Find —> Replace and search for each number 0 to 9 and replace it with nothing (leave the Replace With text area blank). Convert your list to a table by selecting it and clicking Table —> Convert —> Text to Table. Set it to a one-column wide table and select the Paragraph option. When it is created, add a second column to the table and you can begin entering the index entries.

When you've created your concordance file, follow the instructions in the step-by-step guide to add the index entries and complete your index. PCU

The index will be created when you click the OK button in the Index dialog.

Fixing your old photos

Helen Bradley shows you how to repair damaged images using Paint Shop Pro.

You'll find them in a box in the garage or buried at the bottom of a cupboard — they're pictures of your ancestors and many aren't in great condition. However, if you have a computer, you can fix many of the problems and distribute the resulting images to other family members.

A reader, Joan Demosthenous, wrote to us asking how she could fix an 1850s photo she'd damaged herself as a child. So, we thought that we'd take a look at how you can bring new life to your old pictures. This month, we show you some techniques for digitally restoring the images, and next month, we look at how to colourise them.

Before we begin, a word of caution. The images you are working with have historical significance and are irreplaceable. No matter where they've been stored in the past, they should be stored for the future in a clean protective (acid-free) box at a constant temperature. If you know who the people are in the photos, write down this information and put it with the photos (use acid-free paper and place the paper where the ink can't transfer onto the photos). Take care not to bend the photos or jam more than will fit into a box, don't remove them from their original paper frames and don't cut them up.

You'll find some useful information, tips and techniques for storing and displaying heirloom images at these sites: **www.montana.edu/wwwpb/univ/photos.html** and **www.pbs.org/kbyu/ancestors/records/family/extra1.html**.

Start with a scan

Use white gloves when handling the photos and scan them at a high resolution (at least 300dpi). There's simply no point in doing all the work involved in digitally restoring an image, only to end up with insufficient image data to make a decent print from it. Scan the image into a TIF or BMP format file and use the best quality photograph setting on your scanner (not 256 colours). Avoid using the JPEG format as it is lossy, with the result being the permanent loss of some image quality every time you save the image.

If you have a small image and intend to print it at a larger size, you may consider scanning it at 600dpi, which will allow you to double the current image size. If you don't have a scanner, photograph the image with a digital camera set to the best image quality it can take, then download the image to your computer.

When saving the image, call it something like sarah_original.bmp then, each time you work on it, name it with a sequential number sarah_01.bmp, sarah_02.bmp. This makes it easy to identify the file belonging to the most recent editing session, and you can always go back to an earlier session (or your original scan) and start over if you don't like the results you've achieved.

Always keep a backup copy of your work on a removable storage device (CDs and DVDs are ideal). Check you can read these on another computer so you can still access them if your computer dies. Store one set of backups in a location separate from the computer, such as your holiday house, bank, desk at work and so on.

Accessing the damage

Open the image in your graphics software and take a good look at it. Write a list of things that need fixing, so you know what needs to be done and you can plan your attack. This is a typical plan in the order of approach: fix large scratches, clean up spots, remove dust, remove any excess noise, correct colour problems, and crop. Avoid cropping unwanted areas from the image until you know they really are not wanted. You don't have to clean up these areas, just leave them there for now.

When you're editing your images, work in short bursts and save the file repeatedly as you go. If you're unsure whether you like a change, click the Undo button to undo the effect of a filter, for example. Then click Redo and you can see the change applied. Choose the version you like and go forward from there. Or, if you are about to apply a filter or do some major work on an area, use the Duplicate command to make a copy of the image. Then work on one copy and you'll have the original sitting there to compare with. Don't hesitate to discard what you've done and start over if you're not happy with the results.

Take the time to adjust each tool's settings before you start. If necessary, test the tool on a duplicate of the image, and then adjust the settings until it works as you expect it to. If a tool isn't working, then look for an alternative. For example, sometimes the dust and scratch tool will destroy too much image data when you use it, so fixing the dust yourself manually might be the best alternative.

Take notes as you work. Write down the tools you've used and take note of the settings and successfulness, or otherwise, of using them. This way, you will build up your own resource kit for working on images with your particular graphics software. You'll find the information will help you work faster on the next image. PCU

TOP TIP

Remember, even though old photos might be in your possession right now, they belong to future generations. Treat them with care and respect, as they are someone else's history, as well as being part of yours.

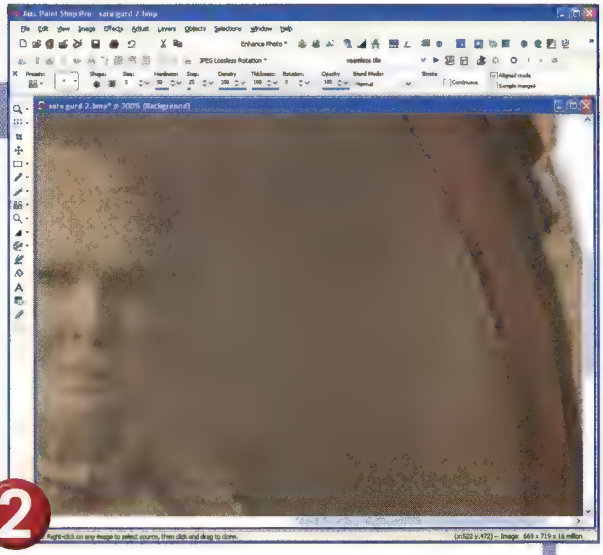
WHAT IS A HISTOGRAM?

The Histogram tool in your graphics software shows a chart of the relative darkness of all the pixels in the image. The chart goes from dark to light across the X (bottom) axis, and the number of pixels of each value appear on the Y (left) axis. Ideally, you should have a spread of pixels from dark to light and they should form a curve. One typical adjustment involves dragging the left and right sliders inwards until they are under the first pixels in the chart. This sets the black and white points for the image and improves the contrast.

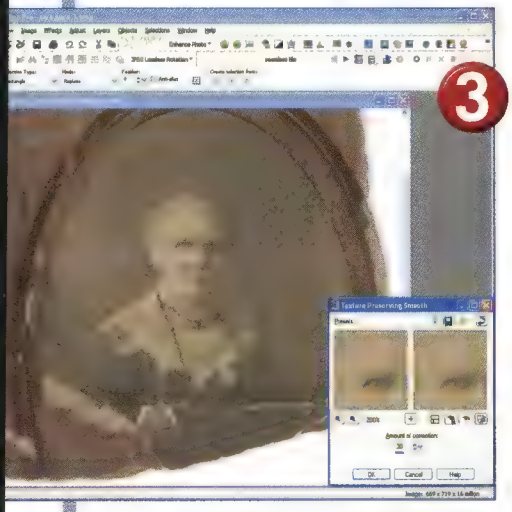
STEP BY STEP: FIXING AN IMAGE

This image from the 1850s was damaged many years ago and is sorely in need of some repair.

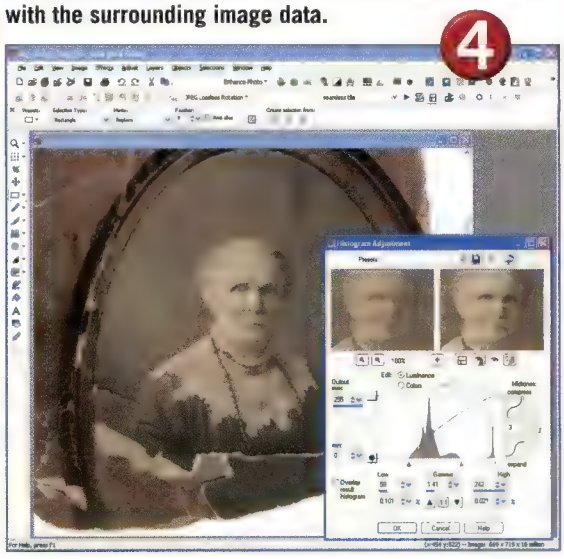
1 Open a high-quality scan of the image in a graphics program like Paint Shop Pro (we are using version 8). Using the Scratch tool (in Photoshop, try the Healing tool), adjust its settings and test it on the scratch. Zoom in and carefully remove the scratches, or pen marks, working in small increments.



2 There are some large spots on the image that have been caused by mishandling and perhaps some moisture damage. These can be removed with the Clone tool, as there is plenty of background image data that has the same colouring as the area we are trying to replace. Use the Clone tool to 'paint' over the mark with the surrounding image data.

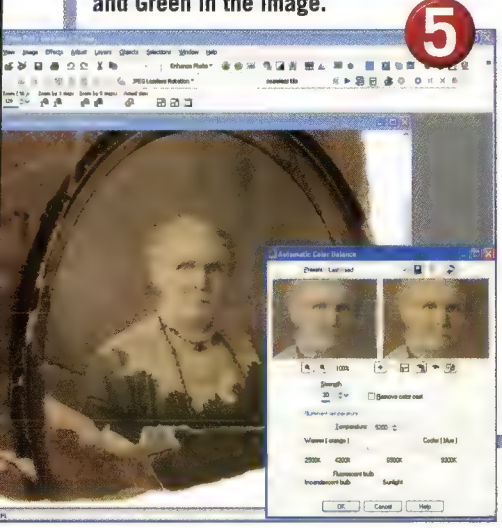


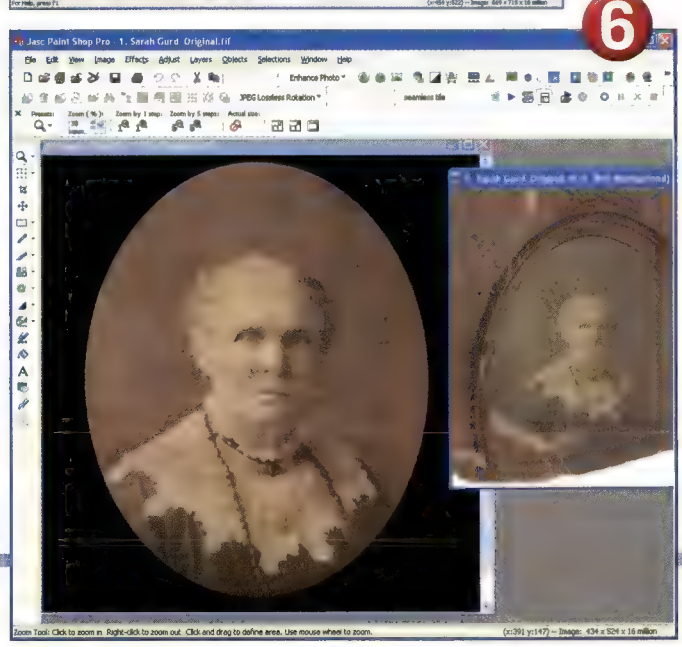
3 Experiment with filters like the Salt and Pepper filter, Median filter and Despeckle filter to see what works best to smooth small areas of uneven pixels without blurring the image too much. We found the Texture Preserving Smooth tool worked well for this image.



4 To correct tonal problems, we used the Histogram Adjustment tool. This allowed us to tweak the gamma for all three colour channels (RGB) and the Luminance. We worked at adjusting the low and high points to the edges of the histogram to develop more areas of light and dark in the image.

5 To return to the original sepia of the image, we used the Automatic Color Balance tool and selected a temperature of about 5,000K, and disabled the option that would further remove the colour cast. We also used the Color Balance tool to finely adjust the proportions of Red, Blue and Green in the image.





6 Finally, we made an elliptical selection on the image at the size of the image we wanted to keep. We used the Mover tool to move it into position, then cropped it by clicking Image —> Crop to Selection. We then increased the canvas size to add an area of black around the image.

Improve site navigation

Make navigating your sites more intuitive. Helen Bradley shows you how to do it using Microsoft FrontPage or Publisher.

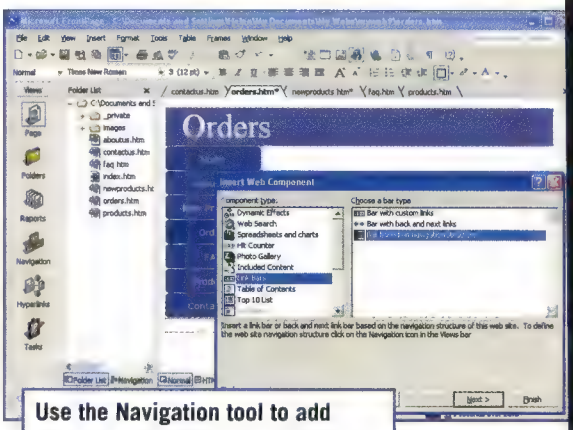
When creating a Web site in either FrontPage or Publisher, you have two possible methods of approach. One is to use the built-in templates and end up with a Web page that looks like many others you'll encounter on the Web, and the other is to do it from scratch. When you build from scratch, you'll want to take advantage of the automation features available in the program, even if you don't use the look and feel of the templates.

Unfortunately, neither program makes it particularly easy for you to add navigation bars, as the tools are either hidden away in a place where you won't think to look (in the case of Publisher) or they work in strange ways (as in FrontPage).

Publisher navigation bars

In Publisher, the Navigation Bar wizard can manage your navigation for you. You simply add a navigation bar to your page then set up each page to be included in the navigation bar, with a title to appear in it. The wizard can manage a site with up to 10 pages on the navigation bar, which is ample for most situations where you would use Publisher.

You can have more pages than this on your site, but to do so, you will need to add hyperlinks yourself to link the additional pages. The step-by-step instructions show the basics of starting a Web site from scratch in Publisher, and inserting and customising the navigation bar.



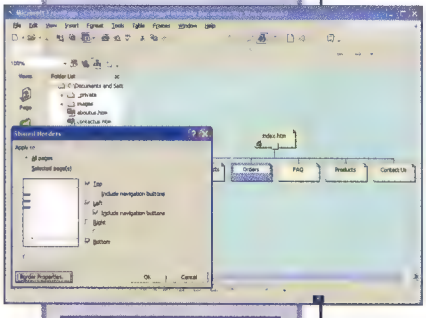
Use the Navigation tool to add links in the bottom shared border.

FrontPage navigation

FrontPage uses a tool called Shared Borders to let you place objects on all the pages of your site at the one time. Anything in a shared border will appear on every page that displays shared borders. So, you can add shared borders to one or more pages and you can set objects to appear in those borders. Unfortunately, there aren't multiple versions of the shared borders, so it is an all or nothing thing: on or off.

Typically, you'll use the bottom shared border to put your contact information as well as copyright details, and perhaps even a set of text navigation links. The left border is commonly used for navigation links, and the top for either navigation links or a page banner, or both.

To turn on shared borders for a Web site, click Format —> Shared Borders then select the borders you wish to enable from the options: Top, Left, Right and Bottom. You can enable or disable as many of these as you want, then click the All Pages option to add them to every page. For the Top and/or Left borders, you can elect that they contain navigation buttons. There's no option to add navigation buttons to the bottom border, but you can do this manually later on.



Use the Navigation view to add shared borders to your FrontPage Web site.

If you enable navigation buttons for the top shared border, you will see the page heading displayed in the page's top border. This might look like it should reflect the page name in the navigation bar, but it doesn't. You will change the page's title for the navigation system from the Navigation view by altering the name of the page as it appears in the hierarchical chart. Click a page, press F2 and type its new name — this then appears in the navigation bar.

If, instead of adding mavigation to the top border, you add it to the left border, the buttons can display down the left of the page. This is a better choice when you have more than three or four pages, as the buttons stack one on top of the other and the page can expand in length easily as more are added.

To add text to the other borders, you can click in the border area and type the text. In addition to navigation buttons down the left or across the top of the page, you can also include navigation links in the bottom border. It is common practice to place text links here for visitors who are surfing with image display in their browsers disabled.

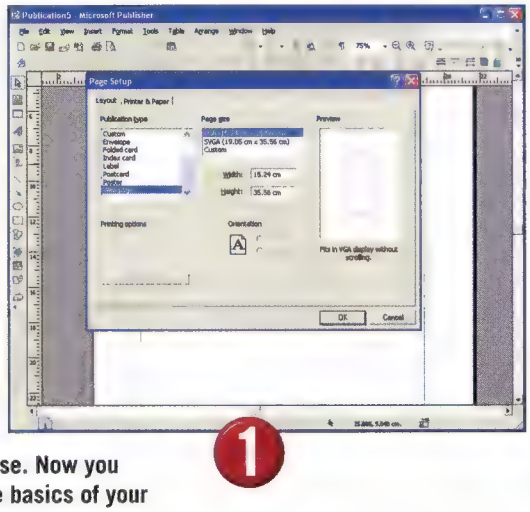
To do this, assuming you have the bottom border enabled, click inside it and go to Insert —> Navigation and select the 'Bar based on navigation structure' option. Click Next, then navigate to the bottom of the list and select one of the plain text styles from the Style list and click Next. Choose the horizontal orientation and click Finish. Then select 'Child pages under Home' and the 'Home page' options, and click OK to add the bar.

To alter the way a navigation bar looks or to change its content, right-click on it and select Link Bar Properties from the pop-up menu.

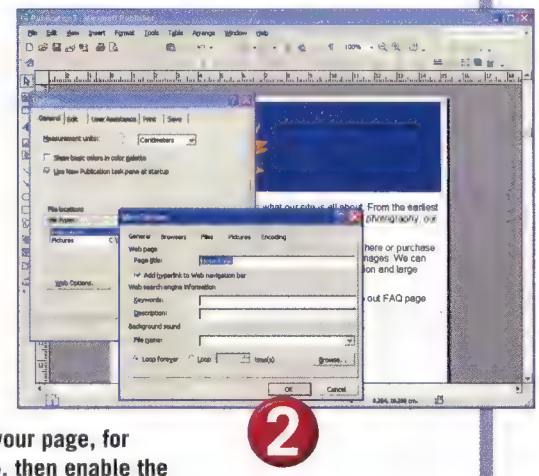
While the navigation options are a little confusing in both Publisher and FrontPage, when you know where to look for them and how they work, it makes them easier to use and it beats creating your own. PCU

STEP BY STEP: CREATE NAVIGATION BARS WITH PUBLISHER 2002

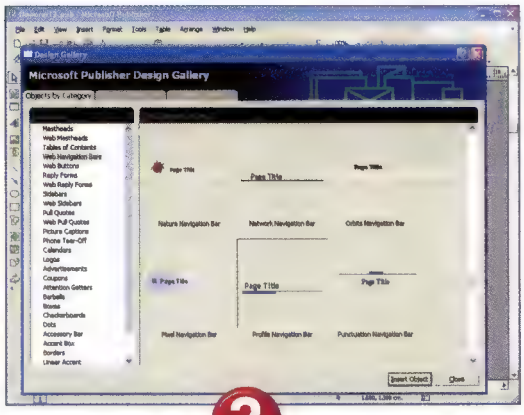
1 Create your Web site home page by creating a new blank document. Click File —> Page Setup and select 'Web page' as the publication type, then choose a page size to use. Now you can create the basics of your site's home page.



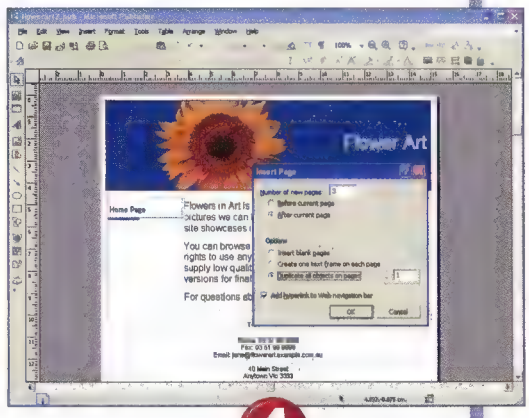
2 When you're done creating your page, you're ready to add more pages and a navigation bar. Click Tools —> Options —> General tab and click the Web Options button. Type a title for your page, for example, Home, then enable the 'Add hyperlink to Web navigation bar' checkbox.



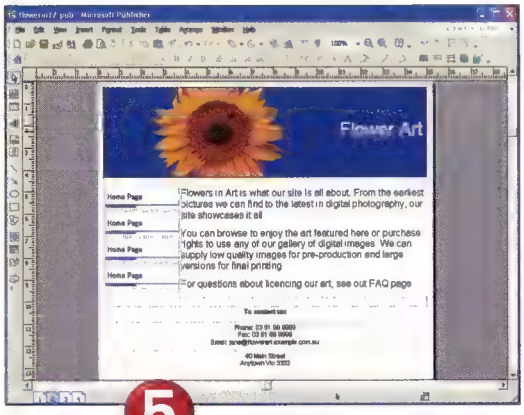
3 Now you can add the navigation bar. To do this click Insert —> Design Gallery Object and click the Web Navigation Bars option in the Categories list. Now choose a design to use and click Insert Object to add it to your page. Move it into position.



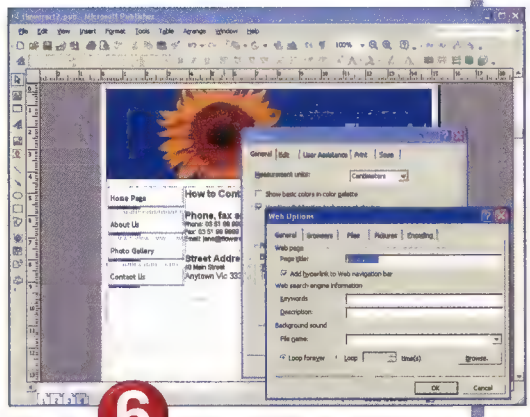
4 A button for your home page will be inserted into your page. You're now in pretty much the same position as if you created the page using a Publisher Web template, but you've designed the page yourself. Add more pages by clicking Insert —> Page — it helps shortcut the setup process if you make them duplicates of the home page.



5 Enable the 'Add hyperlink to Web navigation bar' option and click OK. You now have multiple pages added to your Web site. However, right now, all these have the same name as the home page of your site and the same contents. You can alter the content to suit yourself.



6 To change a page's name in the navigation bar, click the page and go to Tools —> Options —> General tab, click the Web Options button, type a title and click OK. You can also type a filename for any of these pages, if desired, which will be the name the page will be saved with when published.



Game Maker scripting

Learn how to work with scripts and avoid copyright woes, as Angus Kidman continues our series of game development tutorials.

TOP TIP

Game Maker's built-in Game Maker Language (GML) includes a large number of commands and variables, and we won't be able to cover them all here (they're all listed in the built-in help if you're curious). The following are the important basic rules for structuring scripts.

- **Each script must be enclosed within curly brackets; that is, the first character is a {, and the last is a }.**
- **Each statement within the script must end with a semicolon (;).**
- **Comments (very useful later, even if you don't think you need them now) are included by putting a double slash (//) at the beginning of a line; everything after this will be ignored.**

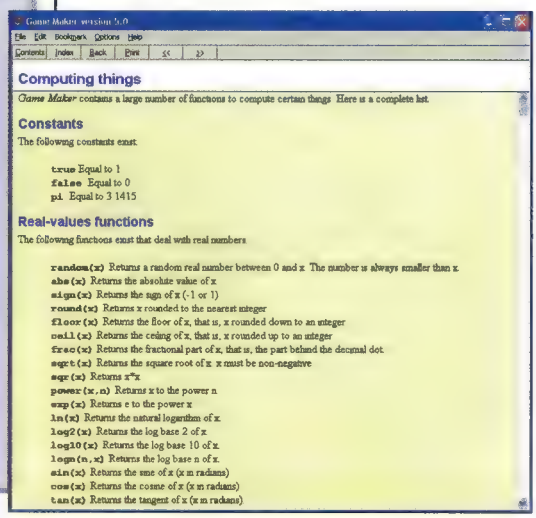
Game Maker will automatically tidy up your scripts with colour coding and indenting, making them easier to read.

This month, we're going to continue exploring the scripting possibilities in Game Maker, which we began using in the June issue. The ability to use a programming script as well as rapid visual development gives us the best of both worlds — we can build basic interfaces quickly and then refine them using scripts.

However, before we look at how to develop a more complex script in detail, it's time for the long-promised lecture on the subject of copyright. As we've noted, many games developers (especially amateurs) begin by producing copies of existing, well-known games. This isn't a problem if you take a traditional game that's long out of copyright, such as Chess or Othello, but it can become an issue if you emulate a more recent title, such as Pac-Man (which we looked at in the June issue). The number of game genres is fairly limited, but that doesn't mean the original developers of those concepts aren't entitled to defend their work.

The fact that copying game ideas is illegal hasn't stopped many people, of course. There are literally hundreds of clones of Tetris out there, for example, and it seems unlikely that every developer involved is going to be sued in the near future. However, the fact that it's unlikely doesn't make it impossible. The students recently sued in Australia for downloading MP3 files probably figured they were safely anonymous as well.

If even the vague imagined threat of a lawsuit concerns you, you should stay away from copying other game concepts as much as possible. As a means of educating yourself, the process of copying an existing game may have its uses, but you'll be safer if you avoid distributing your efforts in this area to others. If you want to look at it in a more mercenary light, you've got a much better chance of making a fortune from an original game concept than from a knock-off that's probably been executed better by a professional developer anyway.



A second area where many amateur game developers run foul of copyright law is by using copyrighted artwork or characters from their favourite television show, movie or musical group. This is especially common with in-game level editors, which almost invariably spawn customised levels featuring characters from *The Simpsons*, but this also occurs with standalone games.

The situation here is even more straightforward: unless you've been granted a licence, you have no right to use such characters and images, and the distribution of games featuring them is a clear violation of copyright law. Arguing that you're only expressing yourself or attempting to build enthusiasm for the property may work occasionally, but doesn't constitute a sound legal defence.

Will any of this really affect you if you're developing games purely for your own use, or distributing them free of charge on the Internet? The answer is a qualified 'yes'. Some copyright holders are very careful about defending their properties. Anyone who draws the line even at fan tribute Web sites (which has happened in recent years in the Star Trek community, for instance) is not going to look kindly on other electronic adaptations. Others take the view that all fan activity is to be encouraged, but unless you have an explicit statement to this effect, you're taking a definite risk.

Incidentally, the argument that you're not making any money out of a game isn't much of a defence either. It would be possible, if somewhat unlikely, for George Lucas to argue that the existence of your 'free' Star Wars tribute game had reduced the sales potential of officially licensed versions. He'll certainly be able to afford better lawyers.

Random movement

OK, enough nagging. Let's get back to the development desktop. If you follow the instructions in the Top Tip, you'll create a very basic game element that makes a hamburger move randomly around the screen, using a very small piece of scripting. This type of random movement is very common for enemy characters in games.

While our existing script gives the impression of random movement, it isn't particularly effective, with the burger wobbling all over the screen rather than giving an impression of natural movement. We know, hamburgers don't actually move . . .

To make our burger move more impressively, we can use additional scripts. To make the burger change direction after a random period of time, rather than after a fixed period,

Create a new script called **randompause**, and include the following code.

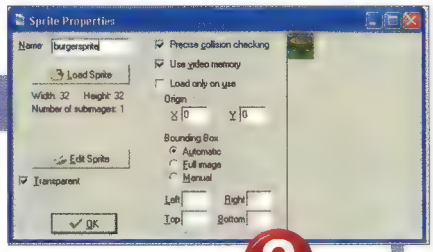
```
{
alarm[0]=random(15)+5;
}
```

STEP BY STEP: CREATING RANDOM BEHAVIOUR

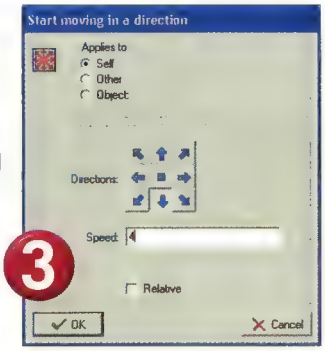
Fire up your copy of Game Maker (we've included it again on this month's CD if you didn't install it last month), create a new game, and make sure Advanced mode is selected on the File menu (since we'll be working with scripts).

1 Right-click on Sprites, select 'Add sprite', rename it burgersprite, and select the burger.ico file from the Examples directory. Click OK.

2 Right-click on Objects, select 'Add object', rename it Burger, select burgersprite as the image to display, and make sure the Solid checkbox is ticked.



3 Click on 'Add event', select Create, then drag the eight-pointed red arrow onto the Actions pane. A dialog box will appear. Select down as the direction, enter 4 as the speed, then click OK. This makes our burger begin moving downwards.

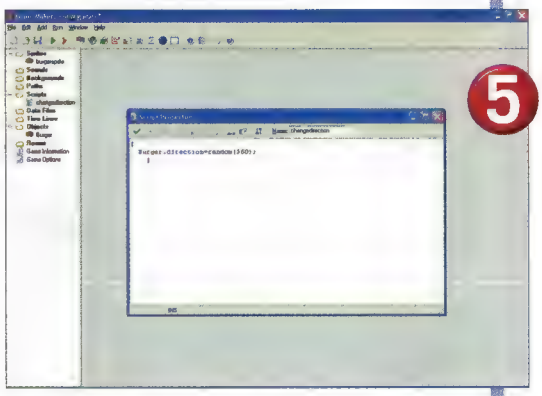


4 Click on the main2 tab at the right, then drag the alarm clock icon onto the Actions pane. Enter 10 for the number of steps, then click OK. This sets an initial value for the Alarm, which we'll be scripting to make direction changes. Click OK.

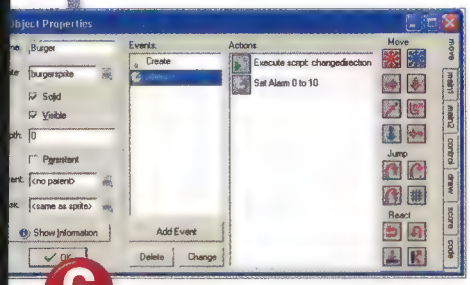
5 Next, we need to enter our script. Right-click scripts, select 'Add script', give the script the name changedirection, then enter the following text, including all punctuation:

```
{
Burger.direction=random(360);
}
```

Close the script window by clicking the green tick in the toolbar.

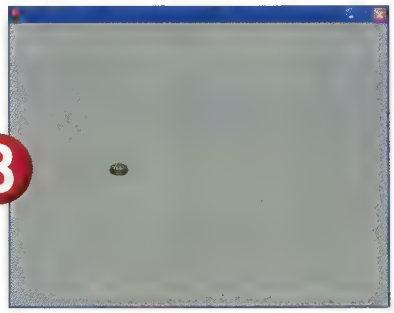


6 Double-click the Burger object, then click Add event, select Alarm then Alarm 0. Click on the code tab at the right, and drag the 'execute a script' button (with the green arrow on it) to the Actions pane. Select the changedirection script then click OK. Next, select the alarm clock again from the main2 tab, drag it onto the Actions pane, and set a value of 10 steps. This resets the alarm so the process can begin again.



7 Before the game will work, you need to create a room and add the Burger object to it. Right-click Rooms and select 'Add room'. Select Burger under the 'Object to add with left mouse' option, then left-click anywhere on the grid to select a starting position for the Burger. Click OK.

8 Test run the game by selecting 'Run normally' from the Run menu. Hit Esc to stop the code running.



9 You'll notice that if the burger goes offscreen, it continues moving. You can prevent this from happening by adding a new event to the Burger properties. Select 'Add event', Other and 'outside room', then drag the 'Jump to a given position' icon from the move tab to the Actions pane. Set X as 320 and Y as 240, and then click OK. This will return the burger to the centre of the screen if it goes outside the game window.

Replace the existing action, which resets alarm clock 0, with this script (use the Delete key to get rid of the old event), and try running the game again. This code, which simply sets the next change of direction for a period between five and 20 seconds, does improve matters considerably, making it much harder for the player to predict when a movement change will occur. In a full-blown game, we'd probably also include walls and other objects for the burger to collide with, and could thus make the delay between direction changes longer.

The second way we can improve our direction change code is by not always making it a random direction switch. Replace the existing changedirection code with the following code.

```
{
if random(3)=1
{Burger.direction=Burger.direction+180;
}

else
{
  Burger.direction=random(360);
  }
  }
```

The opening random statement means that two out of three times, our direction change will be completely random; on the other occasions, we will reverse direction by 180°. A full-blown movement script would include multiple random events of this type, as well as reacting to other elements onscreen — a task we'll get to work on in the next issue. PCU

SUBSCRIBE FOR YOUR CHANCE TO WIN 1 OF 7

FOR THIS MONTH ONLY
ALL NEW AND RENEWING SUBSCRIBERS
WILL GET THE CHANCE TO WIN A FANTASTIC PIONEER DVR-A06 DVD HIGH SPEED WRITER VALUED AT $599.

SUBSCRIBE TO AUSTRALIA'S NO.1 TECHNOLOGY MAGAZINE

Winner of this year's Sun Microsystems IT Journo Awards for 'Best Technology Title' and 'Best PC or Consumer Technology Title'.

EACH MONTH YOU'LL RECEIVE:

- Tips and tricks for using Windows, applications, upgrading hardware and much more.
- Reviews of the hottest new technology products and practical buying advice.
- Two CDs packed with great software, games, interactive tutorials and more.

Save over $22 by subscribing today

Get 12 issues of Australia's No.1 technology magazine delivered to your door for only $73

3 WAYS TO SUBSCRIBE AND SAVE

- Call 13 61 16
- Visit www.magshop.com.au
- Mail the coupon

PIONEER DVR-A06
DVD HIGH SPEED WRITERS

FEATURES INCLUDE:

- Writes to DVD-/+R at 4X, DVD-RW at 2X and DVD+RW at 2.4X
- Writes to CD-R at 16X and CD-RW at 10X
- Includes award-winning Ulead software: DVD Workshop SE with Dolby AC-3 audio encoder, Video Studio 7.0 SE DVD and DVD Picture Show 2.0 SE (full retail versions, valued at over $1,000)
- Quality high-speed media (1x DVD-R, 1X DVD-RW)

Pioneer

ULEAD
CREATIVE INTELLIGENCE

Authorised under NSW Permit No TPL03/06013 ACT: TP03/2442 NT: NT03/2186
Please see Contents page for the location of the Privacy Notice and Terms and Conditions.

Your technical problems solved

Help Station's heavyweights will knock out your PC problems.

Slow pasting of data

Q When I download a Web page such as an eBay item or my Commonwealth Bank account details using my 56K modem, it may take up to 30 seconds for the page to display. When I cut and paste part of the displayed page into Word for editing and printing, it can take up to five minutes for the page to download again and then paste. If the page is already on my screen, why does it have to be downloaded again and why does it take so long? Is there a setting where the selected information can be copied and pasted locally?
— Roger Gilbert

A Before you try to copy and paste data from the Web to Word, make sure you reboot your computer and close down any open programs you don't need to free up all the resources you can. Also save your Word document (if it already has data in it) before pasting.

If, in spite of these precautions, it continues to take too much time, display the page in Internet Explorer and click File —> Save As, select 'Web Page, complete', give the file a name and click Save. It will still take time to download the page and save it, but probably less time than Word is taking. You can then open the file in Word using File —> Open. However, you may find some pages appear without their images when handled this way. If you're not fussed about the images in the document and really only want the text component, a quicker solution is to click Edit —> Paste Special —> Unformatted Text to paste only the text portion into your document.
— Helen Bradley

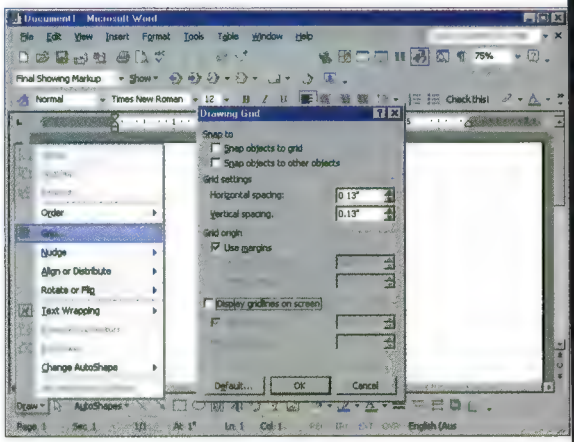
Hiding guides

Q I was trying to set up a table in a Word document and I clicked on gridlines. It wasn't what I wanted and I eventually managed to set up my table. Now, every time I open a Word document I get gridlines. Checking and unchecking gridlines doesn't fix the problem.
— Malcolm Sargent

A You've probably set up gridlines on the Drawing toolbar. Display the toolbar using View —> Toolbars —> Drawing and click Draw, then Grid. Disable the 'Display gridlines on screen' checkbox and click OK. This should fix the problem.
— Helen Bradley

Web images into Word 97

Q I often receive email in Outlook Express 6, which includes screenshots with a GIF extension. I have configured Word 97 so it can now open GIF graphics. When I try to copy the email content into a new Word 97 document, though, the text appears, but there are only spaces where the pictures should be. I have to save each image from Outlook Express on my hard drive, then go back to the Word document and insert them. This is a nuisance. Isn't there a faster way?
— Carol Hayman



Enable and disable gridlines on your Word screen using the tools in the Drawing toolbar.

A Unfortunately, Microsoft Word 97 isn't compatible with Outlook Express in this way. Word 2000 will let you paste images from email, but the earlier version won't. You should be able to right-click the image in Outlook Express and select Copy, then switch to Word and select Paste, which will save a little time.
— Helen Bradley

Missing headers

Q In Microsoft Word XP, when inserting a linked file into another Word document, why does the header and footer information not come across?
— Cheree Cullen

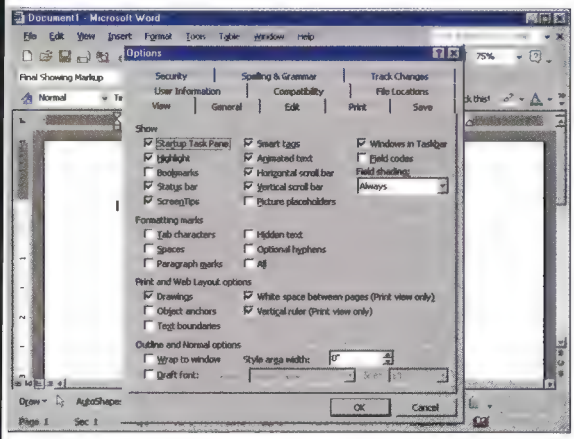
A This behaviour makes perfect sense to me. You're inserting a file into a document that already has its own settings, including its own header and footer. So, if every file you inserted into another document brought its own header and footer with it and overwrote the ones you already had, it would be a sorry mess — the contents of the last file inserted in your document would prevail over all the other settings. If you really need the header and footer to come as well, you'll have to copy them specifically, or perhaps instead of inserting the file, open and edit it.
— Helen Bradley

helpstation
WANT TO ASK A QUESTION?

Get an answer to your PC problem from our team of experts.

Has your question already been asked by another *PC User* reader? These Help Station pages contain highlights from our Web site. Visit us online where you can quickly and easily browse through all the questions submitted by other readers — or ask one of your own.

www.pcuser.com.au
We're here to help you!



Word's View tab in the Options dialog controls what displays in Word, including the task pane.

Display the Word task pane

Q I would like to know how to enable the task pane in Microsoft Word 2002 to always display on opening the application.
— Bill George

A This is a setting in Word. To enable it, click Tools —> Options —> View tab and tick the 'Startup task pane' checkbox, click OK and then restart Word to check the result.
— Helen Bradley

Slide X of Y in PowerPoint

Q How do I number the slides in a PowerPoint presentation? I want to show page X of Y, where Y is the total number of slides and X is the slide number. I can work out how to add the slide number in the footer, but not the total.
— Aneek Mollah

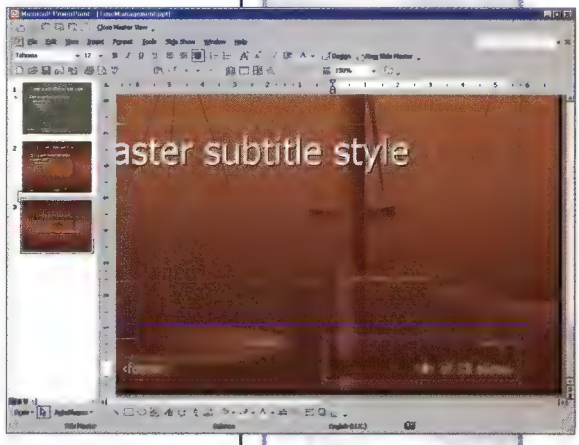
A This isn't as easy as it looks. I know Word lets you do this, but PowerPoint isn't as clever. The simplest way is to click View —> Master —> Slide Master and look for the box in the bottom right of the screen which contains <#>. Click to the right of this and type **of nn slides** where **nn** is the number of slides in your presentation.

```
{MERGEFIELD datefield \@ "dddd, MMMM d, yyyy"}
{MERGEFIELD datefield \@ "dd MMMM, yyyy"}
```

Unfortunately, there's no way to make this 'live', so if you alter the number of slides, you'll have to edit this Master Slide again. I suggest you wait until your presentation is pretty much complete before entering this value.
— Helen Bradley

Rounding up dates

Q Is it possible for Excel to calculate a date three weeks from a specified date to the next Monday? For example, if I was to put 18/03/03 into a cell, which is a Tuesday, I want a formula that will come up with 14/04/03, which is a Monday. That is, Tuesday 18/03/03 plus three weeks would be Tuesday 8/4/03, so I want the result to go forward to the next Monday, which is 14/04/03. Is this possible?
— Alan Parker



Creating a 'Slide X of Y slides' option isn't as easy as you'd expect.

A Yes, it is. Each day of the week has a number associated with it. Sunday is day 1, Monday is day 2 and so on, through to Saturday which is day 7. You can extract this from a date in Excel using the **Weekday** function. So, if your start date is a Monday, you'll just add 21 days to it to get the result you want. If it is a Tuesday, you'll add 21 days, but since this gives you a Tuesday, you need to add another six days to get the result you want. If your start date is a Wednesday, you'll add 21 days plus an extra five to get where you need to be. If your start date is a Thursday, you'll add 21 plus four days, for Friday add 21 plus three days, for Saturday 21 plus two days and for Sunday 21 plus one day.

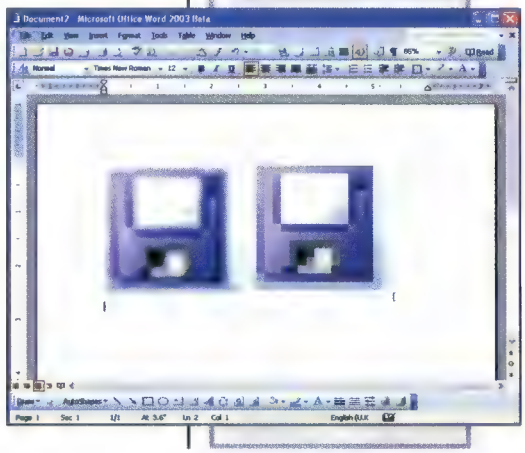
A Choose function can help you link the day of the week to the right number of extra days to add. Here's the formula to use, assuming the start date is in cell A2.

```
=A2+21+Choose(weekday(A2),1,0,6,5,4,3,2,).
```

You can place it in any cell and copy it down the column if required.
— Helen Bradley

Managing screenshots

Q I am trying to complete a manual about using Microsoft Publisher and I require screenshots of small parts of the Publisher working window, such as icons. When I take a screenshot, crop it and then import it into a picture frame or paste it, the image is highly pixelated and unrecognisable. I have tried saving images using both TIF and JPG formats, and I have also tried using the Paste Special options. I've even sized the picture box and then sized the crop to the same size, but I still get fuzzy graphics. It is the same whether I use colour or greyscale. However, if I get a graphic of the Publisher window and import it into Word, it is OK. Can you please advise me how to get better results?
— David Hussey



Resizing small objects, like screenshots of icons, results in a pixelated image or one which is blurry and almost unrecognisable.

A Unfortunately, the problem is you're working with an image that is very small. Icons are usually 16 by 16 or 32 by 32 pixels. If you try to resize images like this, you get one of two things happening: either the program tries to >>

compensate for the poor quality and it guesses some in-between pixels as it resizes, so you get a smoother but blurry result; or it simply turns each pixel into four or more of the same colour so you get a larger image, but one that is made from big blocks of colour. There simply isn't a way around it because you're capturing such small images.
— **Helen Bradley**

Prevent duplicates in Access

Q I have a Customers database in Access 97 into which I enter the names and details of people staying at my campground. I have a Customers form for data entry, but nothing stops me from typing in a new record for someone who already exists in the database. I was hoping when I entered the person's first and last name, something would pop up and say 'Sorry, can't do, this is a duplicate record'. Is this possible?
— **Charlene C**

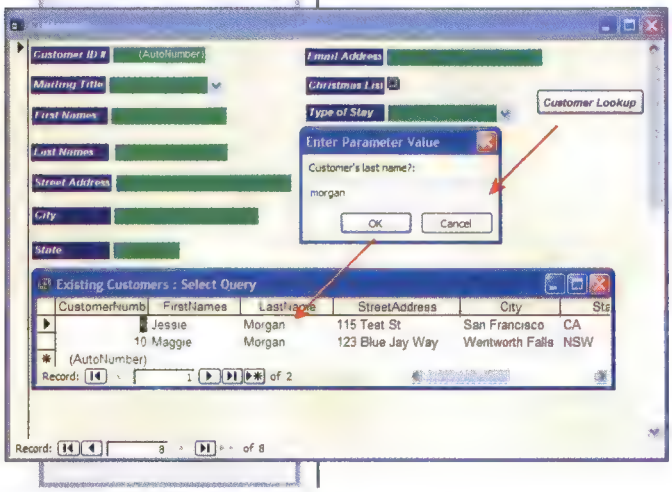
A There are many ways to do this, but I've always felt that Access should make it easier than it does. I'll describe two of the easiest methods, but they're not necessarily the most elegant solutions. The instructions are for Access 97, but the process is almost identical in Access 2000 and XP.

Before you start, make sure your database has at least half a dozen sample records in it, including a couple of customers with the same last name, but different details. This allows you to test that your application is working correctly.

Method 1

1. Open your Customers form.
2. Click the Filter By Form button on the toolbar.
3. Click in the Last Names field and type the person's last name.
4. Click the Apply Filter button to apply the filter.
5. If there are no matching customers in your database, you'll see an empty record form. If there are any matching customers in your database, the first one will be displayed in the form. In the record status section (at the bottom of the form), you should see a message such as '1 of 2 (filtered)'. That indicates two customers matched your filter. To see the second matching customer's record, click the Next Record (forward arrow) button.
6. Once you've checked for matching records, make sure you remove the filter by clicking the Remove Filter button (it's the same as the Apply Filter button, but its function changes depending on whether a filter is already applied). Say, for example, you're about to add John Smith to your customer database. You first run a filter on the last name Smith. If you have five existing Smiths in your database, when you apply the filter you'll be able to step through each of the five Smiths to see if any match the new Smith's details. If you find a match, you can edit the existing record to add any new details. If you don't find a match, then click the Remove Filter button and add a new record in the usual manner.

Use a parameter query run from a command button on a form to avoid duplicates in Access.



Method 2

This method is rather more complex, but it uses queries and some other techniques that will help you develop your application further. It also displays all matching names in a list, instead of page by page in a form, which is much easier if you have many matching names.

In this method, you create a query that allows you to look up a customer's name easily. To make this particularly easy to use, you can put a command button right on your existing Customers form which will run the query when you click it.

1. Open your database in Access and click the Queries tab, then the New button.
2. Select Design View and click OK. This opens the Show Table dialog.
3. Click your Customers table in the Tables list, click the Add button, then click the Close button. You'll now see the Query design grid, with the Customers table shown in the top section.
4. To add fields to the query grid, drag them from the table in the top section into separate columns in the query grid. Add the following fields: CustomerNumber, FirstNames, LastName, Street Address, City, State.
5. Click in the Criteria box in the LastName column in the query grid, and type the following: **[Customer's last name?:]** (make sure you include the square brackets).
6. Click the Save button on the toolbar and name your query **ExistingCustomers**.
7. Click the Run button on the toolbar (it's an exclamation mark). A dialog box should appear with the prompt: 'Customer's last name?'. Type in a customer name that you know exists in the database, and press Enter. A list of all matching customers will then pop up. Or, if you type in a new customer, the list will be empty. You should be able to tell from the address details whether this is an existing John Smith or a new customer with the same name. That's all there is to creating the query.

However, to make things more convenient, it's a good idea to be able to run the query directly from your Customers form. Then you can simply click a button, type in a last name, check whether the customer is listed, and if not, close the query window and continue adding them. If the customer already exists, simply use a Filter (as above) or the Find command to go straight to their record for editing. Here's how to add the command button.

1. Open your Customers form and click the Design View button on the toolbar to go into design mode.
2. If the Toolbox is not visible, click the Toolbox button on the toolbar to display it. Make sure the Controls Wizard button in the Toolbox's toolbar is depressed.
3. You may wish to resize your form a little to create

some room for the button. To do so, drag the right edge of the form window so you have more space to work with, then click and drag the right edge of the form itself to increase its size.

4. Now, click the Command Button in the Toolbox.
5. On your form, click and drag to draw a small button. When you release your mouse, the Command Button Wizard will pop up (one of the real wonders of Access).
6. In the Categories list, select Miscellaneous. In the Actions list, select Run Query, then click Next.
7. In the Query list, select ExistingCustomers and click Next.
8. Click Text to create a text button, and type Customer Lookup as the text, then click Next.
9. Type **CustomerLookupButton** (no spaces) as the name of the control you've just created. Click Finish.
10. Back in your form, click the Form View button on the toolbar to exit design mode and return to your data entry form. You should now see your old familiar form with the Customer Lookup button added. Click the button and the ExistingCustomers query will run, and you'll be prompted with 'Customer's last name?'. When you type it in and press Enter, you'll see a list of matching records.

— **Rose Vines**

Moving around Excel

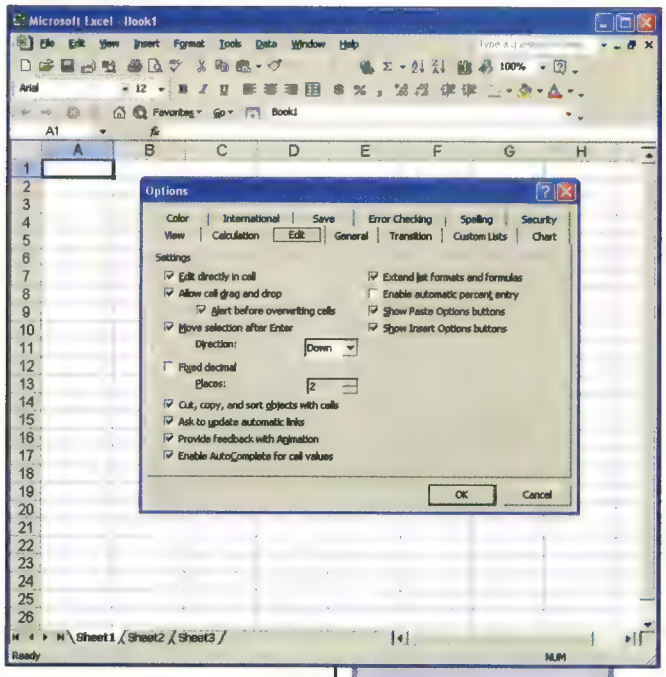
Q I am using Microsoft Excel and I want to create a spreadsheet with a fixed number of columns. How can I get the cursor to return automatically to cell to B1 after inputting data into cell A4?

— **Tony Powierza**

A This is fairly simple.

1. Click Tools —> Options —> Edit tab, tick the 'Move selection after Enter' checkbox and select Down from the drop-down dialog. Click OK to confirm this setting.
2. Select a range of cells only four rows deep, for example, A1:H4.
3. Type your first cell entry and press Enter to move down one cell.
4. Continue to do this, and when you get to cell A4, you'll be automatically taken to cell B1 to continue. You can go backwards by pressing Shift-Enter, and if you need to skip over a cell (empty or with data in it), just press Enter and it won't be altered.

— **Helen Bradley** >>>



The Excel options dialog allows you to select where the cursor moves when you press Enter.

Web Hosting Rescue

Server101 WEB HOSTING

The performance and availability of your website largely depends on your provider's infrastructure.

Switch to Server101 and enjoy the reliability of being hosted on a fully redundant, load balanced server farm.

Our limited time rescue offer includes the waiving of our setup fee and up to six months credit for any remaining time you may have at your current web host.*

http://www.server101.com.au/rescue

*conditions apply - refer to www.server101.com for details.

shared hosting - dedicated/advanced hosting - domain registration - partner programs

Level 12/301 Coronation Drive Milton :: PO Box 1508, Milton BC Queensland Australia 4064 :: ph:07 3876 6101 :: fx:07 3876 3101 :: abn 18 084 840 451

NETWORKING Q&A

Network gaming

Q I have two computers networked for file sharing. They both connect directly to the Internet via a five-port hub. They both have TCP/IP, NetBEUI and IPX/SPX protocols installed. I have access to both computers through the other, without problems. When I try to host a LAN game on either computer, some games will not recognise any host games running on the other computer. I've played these games before through the same hub but I can't seem to find what the problem is now.
— Frigate Ponder

A From your description, you have connected directly from a hub to a modem (most likely a broadband modem with an Ethernet interface) and don't have a router in between the hub and modem. This will cause all sorts of problems. You will need a hardware router, or a software router such as Windows Internet Connection Sharing (ICS). I suggest you disconnect the cable from the hub to the modem, and see if you can play LAN games. This will indicate whether the Internet connection is the main problem, or if it could be elsewhere. The other thing to do is check your Internet sharing setup. You'll need either ICS (or similar software) or a hardware router.
— John Hepworth

«<<

DMI pool data

Q Since my reformat, my PC is taking 100 seconds to load — 45 seconds of this is taken up with 'Verifying DMI Pool Data'. On startup, the 'Verifying DMI Pool Data' message appears for a few seconds, then the Windows 98 logo screen appears. The DMI message comes up again and is displayed for 45 seconds. I'm not on a network and as far as I know, I'm not running the third-party Desktop Management Interface (DMIStart) utility, nor do I have the utility on my PC. I've also upgraded to Office 2000 from Office 98.
— Keith Partridge

A The Desktop Management Interface (DMI) is a method of managing computers in an enterprise, and you have it whether you're networked or not. The main component of DMI is the Management Information Format Database, or MIFD (the DMI Pool Data). This database contains all the information about the computing system and its components.

At times, some systems may experience a hang condition after partitioning, formatting and initial bootup of a hard drive. In Windows 95 and 98, changes to the motherboard's BIOS settings, changes in hard drives, or to hard drive settings or BIOS settings alter this pool data. The message 'Verifying DMI Pool Data' appears and the system hangs. In your case, the computer appears able to resolve the problem after chewing on it for a while.

If you haven't changed any of your hardware or overclocked the system, the cause may be damage to your master boot record. If so, you may be able to get rid of the error message by booting from your startup floppy into DOS mode, typing **FDISK/MBR** and pressing Enter. This renews your master boot record.
— Jan Wikström

Comparing two files

Q I'm looking for a program that will compare two files with long filenames and tell me if one has changed. It's a bit like the old CRC32.com program from the DOS days, which ran a CRC calculation on the file and presented me with a hex code 'fingerprint'. Any ideas?
— Annette Edwards

A Use the FC (File Compare) command in a DOS window. At the DOS prompt, you can get a terse listing of the FC options by typing **FC /?** and pressing Enter. Use the **/b** switch for comparing program files and **/l** for text files. If a filename includes one or more spaces, be sure to enclose the name in double quotes.
— Link Harris

File renaming explained

Q I've read Help Station replies to a lot of questions concerning renaming files. How and why do you have to do this? There was one question in particular from someone having problems with installing XP from floppy. Your reply was to rename certain files. Do I have to rename files from DOS?
— Margaret Nacsa

A There are a few reasons for suggesting people rename files, but the most common one is this: sometimes we suspect a particular file is getting in the way of a process, or a particular file is unnecessary and just wasting space. The easiest way to deal with such a file is to rename it — this makes the file inaccessible to a program that would otherwise use it, yet effectively 'stores' the file in case you want it back. Once you realise you really don't want it, you can permanently delete it.

For example, let's say you find a huge file called lumps.dat on your system, and you suspect it's been left over by a program you didn't uninstall properly. Simply change the filename to something like lumps.mn (your initials) and reboot the PC. If everything keeps working OK, you can eventually make the decision to delete lumps.mn. However, if a program called LumpStacker starts complaining it can't open a file called lumps.dat, you'll know that you then have to rename lumps.mn back to lumps.dat.

You don't have to go out to DOS to rename a file, but if you find Windows denies access to a file it is currently using, you may have to do so. In Windows 9x/Me, that's easy enough — all you do is reboot in DOS mode. In Windows XP, you may need to use the Recovery Console to rename locked files.

However, in most instances, you can rename files either via Windows Explorer or directly from the desktop. All you have to do is right-click the file, select Rename from the pop-up menu, type in the new name and press Enter. Note that filenames cannot include the following special characters: \ / : * ? " < > |.
— Paul Zucker

LINUX Q&A

Where can I get Linux?

Q Where I can purchase a copy of Linux?
— Greg Abdy

A If you're new to Linux, probably the easiest way to get a copy is to visit a bookshop. There are many how-to books that include a complete version of Linux, together with a complete guide to using the operating system. If you've only ever used Windows, this is a great way to go.
Otherwise, check out Everything Linux (www.everythinglinux.com.au), Linux System Labs (www.lsl.com.au) or one of the other Australian Linux sites (do a Google search for "linux distributions site:au"). These sites offer a choice of Linux distributions. Good choices for beginners are Mandrake or SuSE.
— Paul Zucker

Inaccessible dialog buttons

Q I opened Control Panel —> Display and altered the colour from High Color to 16 colours. That worked, but when I tried to return to the original settings, I couldn't get at the Apply or OK buttons because they were off the screen. The colour is also as if in Safe Mode — jagged and unclear. I also can't reset the screen resolution. I tried reinstalling Windows 98, but I still have the problem.
— Bernard O'Gady

A This sounds like a couple of problems. First, try to fix the screen resolution problem, as that may also fix your other problem. When you reinstall Windows 98, it usually sets your video to the basic default settings. In order to get higher resolutions and colour, you need to reinstall the drivers for your video card. Do that, and you should find you can once more adjust the screen resolution.

If adjusting the resolution doesn't help you get at the Apply and OK buttons, try using the keyboard controls instead. Try Alt-A for Apply. Or, if you need to do other work on the display, use the Tab key to move around the dialog.

- When you first open the Display Properties dialog, the selection focus should be on Colors. To change the colour resolution, use the up and down arrow keys.
- Press Tab once to move the focus to the Screen Area section. Use the up and down arrow keys to change the settings.
- Press Tab again (or Alt-D) to move to the Advanced button. Pressing Enter will take you into the Advanced properties dialog.
- Press Tab again to select OK, press Enter to click OK and close the dialog.
- Press Tab once more to select Cancel, press Enter to Cancel the dialog.
- Press Tab again (or Alt-A) to move the focus to Apply, press Enter to apply your settings.

— John Hilvert

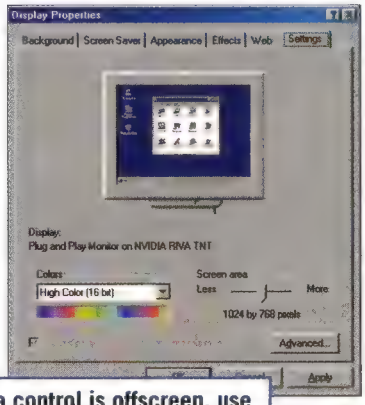
Dual file systems

Q I want to clean install Windows XP Pro SP1 (OEM) on a hard drive that I want to partition into C: (Windows), D: (programs), E: (updates, games and so on) and F: (backup). Can I partition C: as NTFS and the others as FAT32? What implications are there, if any? If such partitioning is OK, what percentage of my space should I allocate to each drive?
— Eddie Poon

A You can have different file systems on different partitions, but I can't imagine a reason why you would want to. It's simple; partitioning simply assigns space to different drive letters, and after partitioning, you use the Format command to format each partition as desired. Format all partitions in FAT32 as usual first. During XP installation, you will be asked about the target and whether you want it formatted in NTFS. This will not affect the other partitions.

As for percentages — well, how long is a piece of string? It depends entirely on what you want to do with your system. All I can suggest is you look at the space usage on your current system and retain those proportions. If you use a partitioning utility such as PartitionMagic, you'll be able to change the relative sizes of the partitions if you need to.

Oh, and it's not a good idea to have the backups on the same physical disk drive. If the drive goes belly up, your backup is lost. An external CD burner and/or second hard disk is a much better way to go.
— Jan Wikström



When a control is offscreen, use Tab, the arrow keys and Enter to adjust settings in a dialog.

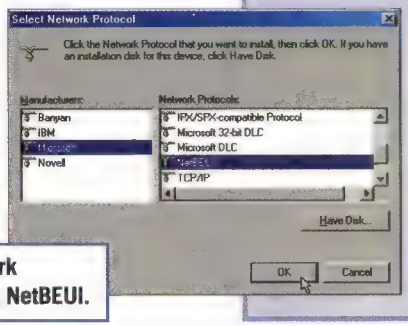
Files in reverse order

Q A few months ago, my XP setup developed a strange problem. When I open a folder such as My Documents or Control Panel, the icons are listed in Z-A order instead of A-Z. For example, in Control Panel I have User Accounts as the first icon when this should be the last in the list. This happens across all folders. I can temporarily fix the problem by using the 'Arrange icons by name' option, but after rebooting the icons are again listed back to front. I thought it may be a virus, but Norton cannot find anything. Any ideas?
— Lee Stevens

A The most likely cause of this problem is that you (or someone else who uses your computer) has changed the default view settings for all folders. You can fic this problem in the following way.

1. Open any folder.
2. Right-click a blank spot in the folder and select Arrange Icons By —> Name from the pop-up menu. Assuming your folder is currently sorted in Z-A order by name, this will reverse the order to A-Z.
3. Make any other adjustments you like to the folder's settings. For example, if you prefer the List view over the Details or Icons view, right-click and select View —> List from the pop-up menu.
4. Once you're satisfied with your folder settings, select Folder Options from the folder's Tools menu and click the View tab.
5. Click 'Apply to all folders' and click OK.

From now on, when you open any folder, you should see your default view and sort order.
— Rose Vines PCU



Diagnose basic network problems by installing NetBEUI.

NETWORKING Q&A

Troubleshooting via NetBEUI

Q Why won't my Windows 98 and Windows Me network work? I've tried all the ideas you've suggested in Help Station and still have no success. I've been told adding NetBEUI might help. My network uses a crossover cable with Belkin network cards.
— David Taylor

A Unfortunately, you haven't given us information on your TCP/IP settings, so we can't check if the problem is in this area. But going to NetBEUI could be an excellent way to check if your hardware setup is OK. NetBEUI has almost no settings to make and the default settings work every time. (If the network doesn't work, you probably have some basic hardware faults.) The downside of NetBEUI is it can't be used to share an Internet connection.

Here's how to install NetBEUI and remove TCP/IP:

1. Open Control Panel on each computer.
2. Open the Network applet.
3. Scroll down to the line that says TCP/IP —> *name_of_your_NIC*. Select it and click the Remove button.
4. Select your NIC (network interface card), click Add, select Protocol and click Add once more.
5. In the left pane, choose Microsoft and in the right pane, choose NetBEUI.
6. Click OK in each dialog to accept the settings and, when prompted, restart the system.
7. Make absolutely sure you have the same workgroup name on all computers and a different computer name for each computer.

If NetBEUI works, you then know you have a TCP/IP settings problem. If NetBEUI does not work, you have a problem with your network card, its drivers, or the cable.
— John Hepworth

Laser printers for under $2,000

Darren Yates tests the latest workgroup and colour lasers for under $2,000 — and finds some great personal lasers under $600, too.

Inkjet printers are fine for home use, but nothing satisfies business printing requirements quite like a laser printer. Lower running costs, far fewer cartridge replacements and superior print quality are just some of the reasons why lasers are generally a better choice for businesses than inkjets.

Most small businesses spend less than $2,000 on a printer, but now there are three categories under this price: personal lasers, workgroup lasers and colour laser printers. Minolta-QMS caused a stir last year when we reviewed its then $1,999 MagiColor 2300DL colour laser printer, but this year, other vendors including Epson and Canon have followed suit. We tested 12 printers in those categories from Brother, Canon, Epson, Hewlett-Packard and Minolta-QMS.

Personal lasers

Sub-$600 personal laser printers used to be little more than 6ppm (pages per minute) models, but speeds have now cranked up to an impressive 16ppm — the same as many workgroup laser printers.

With many now offering dual parallel printer and USB ports, Windows and Mac OS driver software, these printers are now fast enough to consider for use in a small workgroup environment. The majority are not networkable, but you can get around that by connecting it to an older PC and using the PC as a print server.

Workgroup lasers

Still monochrome only, these printers are designed as printing workhorses. At up to $2,000, you're looking for two key features as first-base parameters: the speed and grunt to handle your office's workload, and the ability to connect the printer to your network and manage it easily.

Compared to today's personal lasers, you may not see a huge difference in speed in terms of raw pages per minute, but true workgroup lasers should have a faster processor and more onboard memory — at least 8M or more with a significant expansion option — to cope with long queues and large print jobs.

The printer should have a Fast Ethernet interface, or at least the option, so that you can connect the printer directly to the network, eliminating the need for (and the bottleneck caused by) using a PC for a print server. The better workgroup printers will also have remote management features that allow you to check the printer's vital signs remotely through your Web browser.

Many businesses will also want advanced paper handling capabilities, such as a duplexing unit for automatic double-sided printing, the ability to handle a wide range of paper sizes and media, large optional in-trays for greater capacity, and possibly even sorting options.

Once you've narrowed down your choices, the running cost is the next criteria to consider. Some say that running costs are everything, but we reckon you should look for a printer that does what you want first rather than the model that is cheapest to run. You'll need a toner cartridge with good capacity because with print speeds upwards of 16ppm, it won't take long to go through a small cartridge.

Colour laser printers

Last year, we found one colour printer under $2,000; this year, we saw three. We were also very pleasantly surprised that the colour print quality has improved. The better inkjet photo printers do an outstanding job with special paper, but they can't match the crisp, sharp colours of the lasers on plain paper. Don't expect blindingly fast print speeds — 4ppm colour printing is all you'll get at this price — but the colour lasers are still at least twice as fast as most inkjets. Be sure to check the running costs of the lasers, as a complete set of toner cartridges for the four printing colours — cyan (c), yellow (y), magenta (m) and black (k) — can cost beyond $600. However, you get a lot more for your money than with ink cartridges. Toner cartridges last more than 10 times longer than the ink models — a vital consideration for a busy office.

Running costs

Individual toner cartridges range in price from $100 to well over $200, but don't just judge the running costs on these prices because the cartridge capacities vary enormously between printers. The easiest way to compare running costs is to work out the cost per page, which you can calculate simply by dividing each printer's cartridge cost by its capacity. For colour printers, add the figures for all four cartridges

LASER PRINTER DECISION MAKER

What's the main use of the printer?

Fast mono printer for home or personal workstation

- Monochrome laser
- USB and/or parallel interface
- 10ppm print speed or faster
- 600 by 600dpi resolution
- Low-cost toner cartridges with 4000-page capacity or more
- 100-page or bigger input tray, with more paper handling options

Fast mono printer for a workgroup or small business

- Monochrome laser
- USB and/or parallel interface, plus Fast Ethernet
- 16ppm print speed or faster
- At least 8M onboard memory (with expansion option)
- 600 by 600dpi resolution
- Low-cost toner cartridges with 6,000-page capacity or more
- 250-page or bigger input tray, with more paper handling options
- Duplexing unit (at least optional)

Fast colour printer for home or a small office

- Four-colour printing
- USB and/or parallel interface
- 16ppm mono print speed, 4ppm colour print speed
- At least 8M onboard memory
- 600 by 600dpi resolution
- Low-cost toner cartridges with 4,000-page capacity or more
- 100-page or bigger input tray, with more paper handling options

How much can you afford?

$600 | $1,600 | $1,900

Look for these specifications

Recommended printers

Brother HL-5040 | Brother HL-1870N | Epson AcuLaser C900

WHAT THE SPECS MEAN

Interface. Make sure the printer can connect to your PC, via USB or parallel or preferably both. A Fast Ethernet interface, or at least an option, is important for workgroup printers, allowing it to connect directly to the network without the need to use a PC for a print server.

Print speed. Measured in pages per minute (ppm). The more PCs you have connected to the printer, the higher the ppm rating should be. Just remember that these are the vendors' own speed ratings and are the maximum unless otherwise stated.

Memory. Lots of memory isn't vital for personal mono lasers where your PC can handle the memory requirements, but it's important for networked mono printers and colour lasers to handle large or many print jobs.

Resolution. Measured in dots per inch (dpi), the higher the figure, the greater the density of toner dots on the page, which technically means better print quality. Beware of claims of 'equivalent' resolution or other vague terms. You want the actual resolution. However, there is more to print quality than resolution. Get a demo of the printer and check out the quality yourself.

Toner cartridge capacity. The greater the capacity (measured in pages per cartridge), the less frequently you'll have to change the cartridge. It also affects running costs, as well as the cartridge cost, of course. Don't forget to factor in the cost and capacity of the photoconductor drum, too. We've discussed running costs in more depth on page 104.

Paper handling. Obviously, the larger the input tray, the less often you have to refill the paper, but look for the ability to handle a wide range of paper sizes and media, whether there are optional in-trays for greater capacity and sorting bins.

Duplexing unit. This allows you to do double-sided printing automatically. A duplexing unit is at least optional.

together, with the total representing the cost per full-colour page printed.

However, complicating matters is the need to replace the photoconductor drum as well. These can cost from $150 to over $300, but they are usually rated to last 20,000 pages in mono. It's easy enough to do some more calculations to reach a more accurate cost per page that factors in both toner and drum costs. However, be aware that some cheaper lasers now combine the toner cartridge and drum into one unit, simplifying the cost per page calculation, but theoretically less efficient because separate drums typically last much longer than toner cartridges.

We've done the calculations of the reviewed printers' cost per page (see the table on page 110). However, they are based on the manufacturers' rated capacities and probably won't reflect the actual printing costs, because they are based on unrealistic usage. Still, we believe our calculations provide a fair way of comparing the printers' running costs.

PERSONAL LASER PRINTERS

Brother HL-5040

RATING 9 Price: $569 Contact: Brother Phone: (02) 9887 4344 Web: www.brother.com.au ✔ Fastest printer under $600 ✔ Good print quality ✔ Fast Ethernet option

With a rating of 16ppm, this $569 model is a prime example of how personal laser printers have really cranked up print speed. And the HL-5040 was an outstanding performer in our tests, topping our one-page and 10-page Word document tests in the sub-$600 category. It also finished second, by less than two seconds, in our photo image test. It features both USB and parallel printer ports, and supports both Windows and Apple Mac OS computers and notebooks (Mac OS support via USB only) including Mac OS X. What makes this an even more attractive printer is that it has features normally found only in a workgroup printer: 8M of onboard memory (expandable to 136M), rather than relying on your PC's memory as most personal >>>

<<

lasers do, plus there's an optional Fast Ethernet print server. It also holds up to 250 pages in the paper feed tray with an optional extra 250-page tray. The photoconductor drum is a bit expensive, but with the large 6,500-page capacity toner cartridge costing just $123, the HL-5040 is the cheapest of the personal lasers to run. Text quality was as crisp as you'd expect from a laser printer, but a little feint compared to some others. However, its photo image quality was the best in this category with excellent contrast. All up, this is a great-value personal printer with enough options to grow with your business.

Canon LBP-1120

RATING 7 Price: $379 Contact: Canon Phone: (02) 9805 2000 Web: www.canon.com.au ✓ Low upfront cost ✓ Good text printing ✗ Poor photo image quality

The cheapest personal laser printer we saw was this LBP-1120 from Canon. It's officially priced at $379, but we found it for just $339 on Harris Technology's Web site. It has a 600dpi-resolution 10ppm print engine with vertical standing paper trays, not ideal for keeping paper out of the elements (such as humidity), but it's the most compact printer we saw. At 10ppm, it was easily the slowest printer in this feature, but its text print quality was sparkling. However, where this printer really struggled was photo image printing — our test image lacked contrast and looked too pale. There's no parallel printer port with this one, only USB, and it doesn't support Mac OS computers. There's also no Ethernet network interface option either. The combined toner cartridge/photoconductor drum is cheap, but it's rated at just 2,500 pages, which means you'll be changing it twice as often as some other personal lasers — and that also makes it more expensive to run. It's a good example of how the cheapest printer to buy upfront isn't necessarily the cheapest in the long run. Still, the LBP-1120 is a lot cheaper to run than an inkjet and does a fine job on text printing.

Epson EPL-6100L

RATING 7 Price: $572 Contact: Epson Phone: (02) 8899 3666 Web: www.epson.com.au ✓ Fast mono printer ✓ USB and parallel ports ✗ Expensive cartridge

Epson's latest budget laser printer competes head-on with Brother's HL-5040. Another 16ppm printer, it has a top resolution of 600dpi, which makes it a classy unit at this price. It has both USB and parallel printer ports and supports Mac OS computers, with driver software on CD. However, unlike the HL-5040, there's no Ethernet networking interface option, and it has only 2M of onboard memory. Despite having the same engine speed, the EPL-6100L was just behind the HL-5040 on our 10-page text speed tests, but fractionally faster on the photo image test. However, the HL-5040 clearly has superior photo print quality. The toner cartridge for this printer is the most expensive in this category at $215, making it more expensive to run than the Brother, but with a generous 6,000-page yield, at least you won't be changing it as often as the Canon unit. Overall, the EPL-6100L doesn't match the Brother for value, but it's a fast printer that's great for text printing.

Hewlett-Packard LaserJet 1000w

RATING 7 Price: $449 Contact: Hewlett-Packard Phone: 13 13 47 Web: www.hp.com.au ✓ Good print quality ✓ Fast single-page printer ✗ Parallel port only

Hewlett-Packard has built its name in the IT business on the back of its laser printers. However, its entry-level model lacks some of the features of others at this price. For a start, there's only a parallel printer port. To get USB connectivity, you have to add in an unwieldy parallel-to-USB converter cable and even then, you still don't get Mac OS support. There's no Fast Ethernet option either. The printer is built around a 10ppm/600dpi-resolution engine, similar to Canon's LBP-1120, but the difference here is that the paper-in tray is horizontal and covered, giving some protection to your paper stock. The 1000w is fast in at least one respect — it beat Epson's 16ppm EPL-6100L on the one-page text sprint test by nearly two seconds, but then the 10-page text job dragged out beyond 66 seconds. However, the HP pedigree shines through in one significant way: its print quality, with excellent crisp, dark text. Its photo print quality was also better than most other models in this category. HP's combined toner/drum cartridge may look reasonably priced, but its low 3,500-page capacity makes it more expensive to run than the other personal lasers. All up, you can find better value elsewhere, but the 1000w is worth considering if you value print quality. >>

invent

+hp

Print speeds so incredible, even the colours hold fast.

With the innovative in-line technology of the HP Color LaserJet 4600 and HP Color LaserJet 5500, you can print faster than conventional printers. That's up to 22 pages* per minute in colour, or black and white. Now, what's holding you up?

hp.com/hpincolour

MDHPP5117/PCU © 2003 Hewlett-Packard Development Company, L.P. *HP Color LaserJet 5500

Minolta-QMS PagePro 1200W

RATING 8 **Price:** $499 **Contact:** Minolta-QMS **Phone:** (02) 9884 9966 **Web:** www.minolta-qms.com.au ✔ Good text quality ✔ 1,200dpi engine ✘ Sluggish first page

Minolta-QMS is one of the growing brands in Australia, and its entry-level PagePro 1200W is one model well worth a look. Officially priced at $499, we've seen it on Harris Technology's Web site for just $379. And with a reasonably priced toner cartridge rated for 6,000 pages, it's pretty cheap to run, too. But what makes it a standout is its true 1,200dpi print resolution — the only one of the five in this category to reach this level — and like the Brother printer, it comes with 8M of onboard memory. Print speed is 12ppm, which puts it ahead of both the HP and Canon models, but it took some time to get going. The 1200W was the only printer in this category that was unable to print a single page in under 20 seconds. However, it motors along after that, printing 10 pages in just under 60 seconds. It has both parallel and USB ports, but because it relies on the Windows printing system, it doesn't run on Mac OS computers. It can handle 150 pages in the built-in paper feeder tray, with an optional 500-page cassette underneath. Text print quality here is excellent, very close to the LaserJet 1000w, but photo printing wasn't quite as good as its 1,200dpi engine suggests, with obvious and distracting banding. All up, the 1200W doesn't quite match the best sub-$600 lasers, but it's a good-value unit that's well suited to printing long documents.

WORKGROUP LASERS

Brother HL-1870N

RATING 9 **Price:** $1,599 **Contact:** Brother **Phone:** (02) 9887 4344 **Web:** www.brother.com.au ✔ Built-in networking ✔ Good print quality ✘ Slowest multipage printer

The HL-1870N was the only workgroup printer we received that had built-in networking ready to go. It's also the only one with a built-in duplexer to print on both sides of the page. That's amazing value, particularly at the $1,395 price on the Harris Technology Web site. The printer engine is an 18ppm/600dpi-resolution unit with up to 250 pages in the input tray. You get USB and parallel printer ports, along with the Fast Ethernet interface, and it supports Mac OS computers. Using the USB port connection, the HL-1870N was quite quick over the one-page text sprint, but it was slower than all but two other printers on the 10-page marathon. Its photo print speed was also comparatively slow. That said, text print quality was crisp, neat and hard to fault. Photo print quality lacked contrast and depth compared to the HL-5040, despite both using the same toner cartridge unit. However, the HL-1870N has some management benefits including remote browser checking and even email notification if there's a paper jam — that's clever. The single-line LCD changes colour depending on the action required, and you can have secure printing options as well. Again, Brother's drum unit is a bit expensive, but with a 6,500-page toner cartridge costing just $123, it's cheap to run overall. The HL-1870N probably won't be the choice for offices that churn out long documents, but with networking and duplexing standard, it's the best-value workgroup printer out of the box.

Canon LBP-2000

RATING 9 **Price:** $1,799 (plus $661 for optional print server) **Contact:** Canon **Phone:** (02) 9805 2000 **Web:** www.canon.com.au ✔ Fastest workgroup printer ✔ Prints A3 ✘ Networking not standard

Canon's new LBP-2000 is the only sub-$2,000 laser printer that we've seen to offer A3 printing. It's built around a 20ppm/1,200 by 600dpi engine with both a multipurpose tray and A3 cassette, giving up to 350-page capacity. It features both USB and parallel printer interfaces, although the Fast Ethernet network interface is only an option. The combined toner/drum cartridge is expensive at over $300, but with a huge 10,000-page capacity, it's actually very cheap to run and well suited to busy offices. And it's a flyer, both quick off the mark and with long documents, topping the scores of the entire roundup with both the one-page and 10-page Word printing tests, although it was quite slow with the photo print. The text print quality was very crisp, but just a little feint. However, the photo print quality was surprisingly good with nice work on shadows and skin tones. Priced at just $1,478 on the Harris Technology Web site, the LBP-2000 is an excellent printer for busy offices, spoiled only by the need to pay $661 extra for the networking option.

Epson EPL-6100

RATING 7 **Price: $899 (plus $636 for optional print server) Contact: Epson Phone: (02) 8899 3666 Web: www.epson.com.au ✔ 1,200dpi print resolution ✔ Mac OS support ✘ Sluggish print speeds**

Priced at just $735 on the Harris Technology Web site, the EPL-6100 is the cheapest workgroup printer we saw, although you have to pay $636 more for the networking option. The print engine is a true 1,200dpi/16ppm unit, although when printing at 1,200dpi, it only chugs along at 8ppm. That said, at 600dpi, it was a good performer in our tests, clearly outpacing the Brother HL-1870N in our 10-page Word tests, and with the fastest photo print speed of the entire roundup. It's very similar to the EPL-6100L, with both parallel printer and USB ports and Mac OS support, but it comes with an added paper tray cassette with a capacity of 250 pages. It also uses the same 6,000-page toner cartridge as the EPL-6100L, making it the most expensive of these workgroup printers to run. Text quality was definite and strong with good contrast, but again, the same banding that appeared on the EPL-6100L's photo prints also appeared here, spoiling what would otherwise be good prints. Still, the EPL-6100 would do the job for very small offices looking for a cheap printer.

COLOUR LASER PRINTERS

Canon LASER SHOT LBP-2410

RATING 9 **Price: $1,899 Contact: Canon Phone: (02) 9805 2000 Web: www.canon.com.au ✔ Excellent photo printing ✔ Fast ✘ No parallel port**

The LBP-2410 is typical of the growing number of sub-$2,000 colour lasers in that it offers a 16ppm mono/4ppm colour engine with 600dpi resolution. Four pages per minute might not sound like much, but this unit can do in 32 seconds what an inkjet would struggle to do in three minutes. Vendors are also pushing extra subtle printing effects like extra gradation, which Canon says makes the LBP-2410 capable of a resolution equivalent to 9,600 by 600dpi. Beware of this type of marketing hype — the LBP-2410 is still only a 600dpi printer. However, in this case, the extra graduation appears to help, because the printer's colour photo quality was outstanding. The LBP-2410 reproduced our Photoshop image superbly with a quality we didn't see from any colour laser printer under $5,000 last year. It would take an inkjet printer expensive high-gloss photo paper to achieve the same effect. Its mono text quality was also sharp and bold. It has a USB port, but no parallel printer port. The USB port is true USB 2.0 for higher transfer speeds, but we didn't see much speed improvement over the Epson and HP models we also tested. There's also a network interface option. With four toner cartridges to replace, you'd expect these colour lasers to be more expensive to run than mono lasers, and the same goes for their mono printing, because they generally use lower-capacity black cartridges. The LBP-2410 isn't too bad in this respect, but it's not as cheap to run as the Epson and Minolta-QMS models. Still, on the whole, the LBP-2410 is great value — and even better for the $1,699 price on the Harris Technology Web site.

1 PC USER TOP BUY

Epson AcuLaser C900

RATING 9 **Price: $1,749 Contact: Epson Phone: (02) 8899 3666 Web: www.epson.com.au ✔ Cheapest ever colour laser ✔ 24-bit colour photo mode ✔ USB and parallel ports**

With a rated mono speed of 16ppm, colour speed of 4ppm and resolution of 600dpi, Epson's AcuLaser C900 has the same basic specifications as the other colour lasers that we saw. The text print speeds of the Canon, Epson and HP colour lasers were also around the same, so it comes down to photo printing, features and running costs when deciding between them. The C900's photo print speed was quite good, but a few seconds behind the Canon. However, the colour quality was excellent and Epson's 24-bit photo mode really came to the fore for real photo-quality printing on plain paper. The C900's text printing was bold and black, and although not quite as smooth as other printers we've seen, it certainly does the job. Unlike the Canon and HP units, this one features USB 1.1 and parallel printers ports, plus it has the option of a Fast Ethernet network interface. It also supports Mac OS computers. One down side to colour lasers is their size and at just under 30kg, this is the heaviest of the four we reviewed. However, the C900 is one of the cheapest of the colour printers to run, thanks to the cheap black toner cartridge and very high-capacity drum. The retail price is also outstanding, and we've even seen the C900 sold for just $1,559 on the Harris Technology Web site. At that price, I'd be thinking of ditching my inkjet printer. >>

Hewlett-Packard Color LaserJet 1500

RATING 7 **Price:** $1,906
Contact: Hewlett-Packard
Phone: 13 13 47
Web: www.hp.com.au
✓ Good price ✓ Mac OS support
× Relatively expensive to run

You wouldn't expect rivals HP and Canon to share much of anything, but the HP Color LaserJet 1500 and Canon LBP-2410 both share the same print engine, with exactly the same toner cartridges and installation system. As you would expect, there were many similarities, such as text speed and good, strong, bold text printing. The HP adds Mac OS support and it's cheaper to buy, but in other respects, it doesn't compare favourably with the Canon. It was significantly slower than the Canon with photo printing in our test, and its photo prints were spoiled by a noticeable band of colour down the middle of the photo image, which didn't appear with the Canon unit. Also, despite using the same engine and toner cartridges, HP wants an extra $30 or more for each toner cartridge and $100 extra for the drum, making it the most expensive of the colour lasers to run with both colour and mono printing. We found the LaserJet 1500 for just $1,594 on the Harris Technology Web site, making it one of the cheapest colour lasers on the market. However, you'd only have to replace a few cartridges to make up the upfront cost saving over the Canon LBP-2410. Overall, the LaserJet 1500 isn't a bad printer, but we prefer the Canon or the Epson C900.

LASER PRINTERS: HOW THEY COMPARE

	MONO PERSONAL LASERS					MONO WORKGROUP LASERS	
	Brother HL-5040	Canon LBP-1120	Epson EPL-6100L	HP LaserJet 1000	Minolta-QMS PagePro 1200W	Brother HL-1870N	Canon LBP-2000
SPECIFICATIONS							
Resolution (dpi)	2,400 by 600	600	600	600	1,200	600	1,200 by 600
Mono pages per minute	16	10	16	10	12	18	20
Colour pages per minute	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Memory	8M	512K	2M	1M	8M	32M	8M
Internal paper-in tray capacity	250	125	150	250	150	250	250
Maximum page size	A4	A4	A4	A4	A4	A4	A3
Apple Mac OS support	Yes (USB)	No	Yes (USB)	No	No	Yes	Yes
USB/parallel printer ports	Yes/Yes	Yes/No	Yes/Yes	Yes (cable)/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Ethernet networking	Optional	No	No	No	No	Yes	Optional
Weight	10.5kg	6.7kg	7.9kg	8kg	8.5kg	14.7kg	15kg
RUNNING COSTS							
Rated page capacity of black toner cartridge*	6,500	2,500	6,000	3,500	6,000	6,500	10,000
Black toner cartridge cost	$123	$115	$215	$164	$165	$123	$306
Rated page capacity for colour cartridge*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Colour toner cartridge cost (per CYM colour)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Separate photoconductor drum?	Yes	No	Yes	No	Yes	Yes	No
Rated page capacity of drum*	20,000	N/A	20,000	N/A	20,000	20,000	N/A
Drum cost	$249	N/A	$159.50	N/A	$174.19	$249	N/A
Mono cost per page** (cents)	3.1	4.6	4.4	4.7	3.6	3.1	3.1
Colour cost per page (four colours)** (cents)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TEST RESULTS							
One-page Word document (seconds)	12.18	18.88	14.75	12.97	20.1	14	8.82
10-page Word document (seconds)	44.88	74.65	47.69	66.56	59.63	72.62	36.25
One-page Photoshop image (seconds)	18.75	20.91	17.28	17.16	18.35	20.13	37.47
Text quality rating (out of 10)	8	9	9	9	9	8	8
Photo print quality rating (out of 10)	8	5	6	8	7	8	7

* All page capacities are manufacturers' own ratings, generally based on 5% toner coverage on prints. ** Costs per page are our calculations based on prices of cartridges and drums and manufacturers' rated

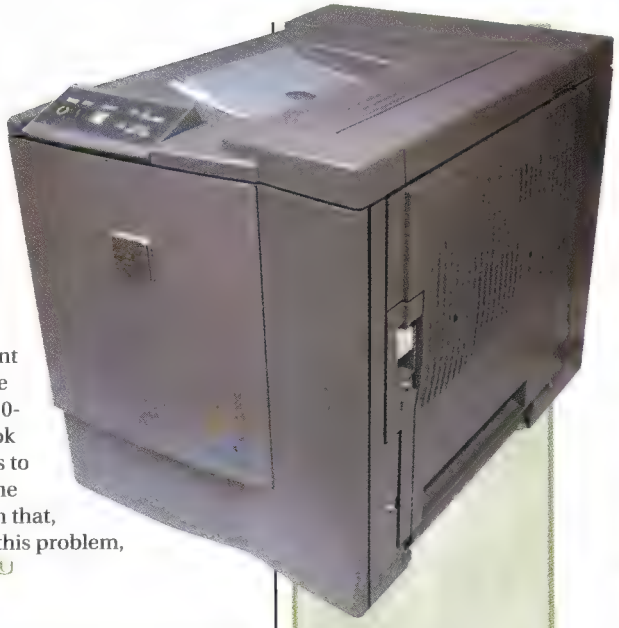
Minolta-QMS magicolor 2300W

RATING 7 Price: $1,795 Contact: Minolta-QMS Phone: (02) 9884 9966 Web: www.minolta-qms.com.au

✓ Low cost ✓ Good print quality × Slow text printing

Minolta-QMS started the sub-$2,000 colour laser printer category and has kept it going with this magicolor 2300W. Featuring a 1,200 by 600dpi printer engine, it too has a top mono speed of 16ppm and 4ppm in colour. It has both USB and parallel printer ports but no Ethernet networking option, nor does it support Mac OS computers. However, with very cheap black and colour toner cartridges, it's the cheapest of these colour lasers to run. Photo image quality was also very good, with excellent skin tones and gradations over the entire image. Its photo print speed was also quite good, but the 2300W has a problem with mono printing — we couldn't fault the text print quality, but the text speed was poor.

That's because the software driver couldn't seem to determine when a print job was a simple mono task or a full-colour print. The printer cycled through all four toner cartridges for mono jobs, instead of just loading the black cartridge. As a result, it took 10 seconds longer to print out a single text page than the other colour lasers, and our 10-page Word text document took the best part of three minutes to print. That's a pity, because the 2300W is a better printer than that, but until Minolta-QMS fixes this problem, it's hard to recommend. PCU



	COLOUR LASERS			
Epson EPL-6100	Canon LASER SHOT LBP-2410	Epson AcuLaser C900	HP Color LaserJet 1500	Minolta-QMS magicolor 2300W
1,200	600	600	600	1,200 by 600
16 (600dpi), 8 (1200dpi)	16	16	16	16
N/A	4	4	4	4
8M	8M	16M	16M	32M
250	125	200	125	200
A4	A4	A4	A4	A4
Yes (USB)	No	Yes	Yes	No
Yes/Yes	Yes/No	Yes/Yes	Yes/No	Yes/Yes
Optional	Optional	Optional	Optional	No
8.4kg	20.7kg	29kg	21.5kg	27.8kg
6,000	5,000	4,500	5,000	4,500
$215	$150	$114	$179	$127
N/A	4,000	4,500	4,000	4,500
N/A	$176	$245	$211	$191
Yes	Yes	Yes	Yes	No
20,000	20,000 (mono); 5,000 (colour)	45,000 pages (mono); 11,500 pages (colour)	20,000 pages (mono); 5,000 pages (colour)	N/A
$159.50	$299	$253	$403.10	N/A
4.4	4.5	3.1	5.6	2.8
N/A	35.6	26	45.6	15.6
13.94	17.81	17.32	17.5	27.03
48.25	51.47	50.06	51.06	160.87
16.47	32.41	37.47	42.13	39.63
8	8	8	8	8
8	9	9	7	8

capacities. (See 'Running costs' on page 104.)

HOW WE TESTED

Each printer was tested on the Adrenalin Computers sub-$1,500 Top Five PC entry using USB connections. Tests carried out included a single-page Word text-only document, a 10-page Word text document, and an 8M 32-bit colour (CYMK) Photoshop image. Each test was timed using a stopwatch from the last interaction to begin the print process, until the last page was released from the printer. Print quality of both the text and photo image was then checked and considered before the final rating was given. All print tests were printed on standard 80gsm copy paper.

Pianos for your PC

Want to be the next Billy Joel or Elton John? Ready to create your own music? Darren Yates samples the latest MIDI keyboards.

ON THE CD

Don't miss Darren Yates' exclusive 13-minute video on how to connect one of these keyboards to your PC, plus a quick tour of DSP's Quartz AudioMaster Freeware MIDI sequencer software, also on this month's CD.

Whether you're ready to be the next big thing in music or just want to have some fun tinkling the ivories, the latest range of keyboards are enough to make any musician's mouth water. But they also continue to blur the lines between traditional music instruments and computer devices.

Connecting your MIDI keyboard to a PC's joystick port via those uncommon five-pin DIN-to-joystick cables, or recording those hit songs onto 3.5in floppies are becoming a thing of the past — MIDI cables are giving way to USB, and floppy disk drives are disappearing in favour of SmartMedia card readers.

That makes it easier for you to download your masterpiece, manipulate it using MIDI production software and even burn your own music CDs.

We rounded up 12 portable models from the three major vendors — Yamaha, Casio and Roland — ranging in price from $399 to $2,999, all with General MIDI capabilities and at least a MIDI-out port.

What to look for

If you're serious about playing the piano, choose a keyboard with weighted keys, which feel like real piano keys. If you're learning, weighted keys will help you learn correct fingering and placement. But as with most things, they don't all feel the same. What you must do is try out each one you're interested in.

Strictly speaking, all these keyboards are synthesisers, because they produce synthesised instruments or voices. However, they have evolved into three categories: home electronic keyboards, studio/stage synthesisers and digital stage pianos.

Home models under $1,500 all have touch keys that aren't weighted, but include some form of sequencer for recording your tunes and a drum kit — the emphasis here is on being able to create the full 'mix' of a song.

Studio-quality synthesisers such as Roland's RD170 are sophisticated tone generators, able to realistically replicate various keyboard sounds from drawbar organs to grand pianos.

The digital stage pianos, such as Yamaha's P80, basically concentrate on just doing one thing: replicating a real piano, with full-size full-complement weighted keys and accurate piano voices.

Weighted key keyboards generally start at about the $2,000 mark — for anything less, expect 'touch-sensitive' keys only. These still allow expression in your playing, but not the same feel as a real piano.

However, if you're more interested in creating your own dance music mixes, low-cost touch-key synths, even at the $1,000 mark, can do a great job.

USB is beginning to appear on some keyboards as a long-term replacement to MIDI connectors. You can record your songs and control the keyboard as usual, but it requires a much-easier-to-find USB cable rather than specialised MIDI cables.

Floppy disks have survived well on keyboards, mainly because MIDI files are quite small (less than 50K for a typical four-minute four-track song), but again, floppy technology is being replaced by flash memory. For now, floppy drives survive on most keyboards below $2,000.

The quality of the instruments, or 'voices', is probably the biggest difference between the cheapies and high-quality keyboards. We're still to hear a realistic stringed instrument, even from the expensive keyboards, but piano voices can be stunning — they're a good way to tell how good a keyboard is.

However, don't be fooled by keyboards that look like the Starship Enterprise's control deck — they can be great fun, but having lots of controls isn't always synonymous with voice quality.

Learning to play a keyboard or piano is one of the most creative and pleasurable skills you can develop, but it needn't cost you a small fortune to get started.

UNDER $1,000

Casio CTK-571

RATING 6 Price: $449 Contact: Shriro Phone: (02) 9415 5555
Web: www.casio.com.au ✓ Cheap ✓ General MIDI
× Poor voice quality

While the 61-touch-keyed CTK-571 is priced nicely at $449, its overall quality puts it not much higher than 'campfire entertainment'. With only four-note polyphony, the voice quality is similar to the FM sounds from five-year-old Sound Blaster cards — in other words, quite poor. However, for your money, you get a reasonable-sized LCD that tells you which keys you're playing, as well as bass and treble clef staves to show you in musical notation. It has some useful learning tools, particularly the ability to practise both hands separately, as well as layering and splitting the keys. Provided you don't expect much, the CTK-571 delivers.

Yamaha PSR-275

PC USER TOP BUY

RATING 9 Price: $399 Contact: Yamaha Music Australia Phone: 1800 805 413 Web: www.yamaha.com
✓ Good voice quality ✓ 32-note polyphony ✓ MIDI in and out

The PSR-275 is everything the CTK-571 could have been — 61 touch-sensitive keys and 32-note polyphony will have you playing complex pieces with ease, but the grand piano voice in this thing at this price is excellent, even through the built-in speakers. It's also not short on instrument voices — 480 in total with 100 accompaniment styles. Some of them are cheesy, but they're still fun to muck around with. There's a backlit LCD that also teaches you basic chords, and you can even add basic reverb and chorus effects to each instrument voice. General MIDI and the 'lite' version of Yamaha's own MIDI extensions, known as XG, are supported and you also have MIDI-in and out ports to connect to your PC. There's no built-in floppy disk drive at this price, but it's nothing your PC, a $50 MIDI cable and free MIDI sequencer software can't fix. It also comes with a headphone socket. If you're looking to have fun and try out your youngsters' feel for music, there's nothing else around that offers the quality and value for this price.

Yamaha PSR-350

RATING 7 Price: $969 Contact: Yamaha Music Australia Phone: 1800 805 413 Web: www.yamaha.com.au
✓ Built-in floppy drive ✓ 500 voices ✗ Better value elsewhere

If you have up to $1,000 to spend and are looking for something of a little higher quality, Yamaha's PSR-350 is worth a look. With 61 full-sized nonweighted keys, the PSR-350 features General MIDI support (in and out) plus a built-in 3.5in floppy disk drive. The voices are of a reasonable quality, with the grand piano voice giving a recognisable rendition. Chord dictionaries — play a number of notes at once and it tells you what chord you're playing — are popular and the PSR-350 includes one. The 32-note polyphony, General MIDI support and over 500 voices should ensure the creative juices keep on flowing. Unfortunately, this model is getting a bit long in the tooth and given the PSR-275's ripper $399 price tag, this one just can't compete.

KEYBOARDS UNDER $2,000

Casio WK-1800

RATING 8 Price: $1,399 Contact: Shriro Phone: (02) 9415 5555 Web: www.casio.com.au ✓ 76 keys
✓ Good voice quality ✗ No weighted keys

This 76-key stereo model from Casio matches up against Yamaha's DGX300 and provides considerably better voice/tone quality over lesser-priced models. It features a built-in floppy drive, so you can capture your creations on disk without hassles. A six-track, two-song tone sequencer allows you to create your own songs from the 232 voices available, or you can just connect your PC directly via the standard five-pin DIN MIDI ports. You choose different voices simply by keying in the correct code into the numeric keypad. The 32-note polyphony is the minimum you should consider for any keyboard and the WK-1800 matches that. Pitch-bend and modulation wheels give you more room for experimentation and there's 130 different drum pattern rhythms to work with. The grand piano voice quality is quite good for the price and the two-way stereo bass-reflex speakers perform surprisingly well. All up, the WK-1800 is a good-value keyboard, but you may prefer the box-style keys of the Yamaha DGX300, so check it first before you buy this.

Roland EM25

RATING 7 Price: $1,095 Contact: Roland Corporation Australia Phone: (02) 9982 8266 Web: www.rolandus.com
✓ Excellent Rhodes voice ✓ Built-in 3.5in floppy drive
✗ Noisy keys

Roland's cheapest keyboard in this roundup didn't convince us of its value. As soon as you start playing, the 61 touch keys don't feel quite right and easily 'chatter' sideways as you play, particularly if you slide between keys. We weren't convinced by its grand piano voice either. However, while we believe Yamaha's piano voices are easily the most realistic, no-one comes close to Roland in producing the classic Rhodes organ sound and for the money, this is where the EM25 did it for us. It has a built-in 3.5in floppy disk drive to capture and play standard MIDI files (SMF), but cheap features such as a push-button volume control don't help. It supports General MIDI and has both MIDI-in and out ports. The >>>

TECH TERMS

General MIDI (or GM). A standard set of synthesised instruments (or 'voices') on any compliant MIDI device.

MIDI (Music Instrument Digital Interface). Standard designed to interconnect synthesisers, but it has become widely used on PC soundcards, too. Unlike digital audio files, a MIDI file does not store actual sound data. It records data about the sound — when a note is pressed, how hard it is pressed, and so on — but not the sound itself. To get a MIDI file to make sound, this data must be conveyed to a MIDI synthesiser — such as the synth on your PC's soundcard or in these keyboards — which interprets and plays the sound.

Polyphony. Refers to how many notes can be voiced at any one time. The better keyboards offer up to 64-note polyphony, but 32-note polyphony would be considered suitable for serious learning.

Sequencer. A computer program that brings together various musical elements to form a song, but for the purpose of these keyboards, think of it as a feature that records your songs. A multitrack sequencer allows you to create sophisticated songs by using a different voice and tune for each track.

Voices. All the different types of sound a synthesiser can make. These voices are based on 'samples' (or very short recordings) of real musical instruments and voices.

Weighted keys. Keys that have a weighted action, just like a real piano.

XG. Yamaha's own voice extension to MIDI.

PLAY IT AGAIN

WATCH THE POWER

Unlike most computer products, many of the cheaper battery-option keyboards we reviewed did not include an AC power supply. You're expected to pick this up separately or use batteries instead. However, given that a set of six to eight D cells will last barely 12 hours, it's not a great option. This is one area where keyboard vendors need to lift their game, particularly given AC power bricks of the type required here wholesale for only a few dollars at most.

built-in stereo speakers don't do it justice, but a stereo headphone port gives you personal practise capabilities. You get 226 onboard voices plus nine drum kits, which you find via the LCD menu system. All up, a fair keyboard, but too expensive for a toy and too cheap to be a serious tool.

Yamaha DGX300

RATING 8 **Price:** $1,229 **Contact:** Yamaha Music Australia **Phone:** 1800 805 413 **Web:** www.yamaha.com

✔ 76 keys ✔ Very good piano voices ✔ 32-note polyphony

The DGX300 from Yamaha goes as close as you'll get at this price to copying a real piano. It features box-style piano keys and although they're not weighted, they at least look the part. Again, Yamaha's piano voice comes to the fore and with 32-note polyphony and 76 keys, you should be able to play just about any piece you can think of. You can have just as much fun exploring the 600-odd General MIDI (GM) and XG-Lite voices built into this thing, but some of the guitar voices are really lame. A rotary volume control and one-touch 'portable grand' voice button make using the DGX300 easy, but you'll need to fork out extra for the power brick — it's not supplied. When you're ready to record your own music, the built-in 3.5in floppy drive should get your creative juices flowing. As with many keyboards, you can 'split' the upper and lower sections into two voices — have a bass guitar for the left hand and piano for the right. MIDI-in and out ports allow you to use this to drive other voice modules or record directly into your PC. If you're looking to spend about $1,200 on a keyboard, make sure you try this one before settling on anything else.

Yamaha PSR-1100

RATING 9 **Price:** $1,995 **Contact:** Yamaha Music Australia **Phone:** 1800 805 413 **Web:** www.yamaha.com

✔ 783 Yamaha voices ✔ 16-track sequencer built in ✔ USB

1 PC USER TOP BUY

Yamaha's new PSR-1100 is one of the most feature-rich keyboards you'll find at this price, with a huge bank of 783 voices. If you can't find something creative in that lot, well, you're not very creative. Featuring 61 touch-sensitive keys, it's not in the same class as the DGX300 if you're thinking of something approaching a real piano, but for a one-man band, this is a must-see. It comes with a 16-track sequencer that will have you creating your own backing tracks and storing them on the 3.5in floppy disk drive that's also built in. The stereo speaker system on this one offers surprisingly good quality, with much better bass for those low notes. And it comes with power brick supplied. The LCD is a passive matrix type, so it doesn't look crash hot, but it enables you to drive the extensive menu system fairly easily. Another feature is the eight drawbar slider controls that enable you to create your own personal organ sounds. Apart from the standard MIDI-in and out ports, this is the first keyboard we've seen for under $2,000 to feature a standard type B USB port — connect this straight to your PC quickly and cheaply. There are so many features on this keyboard, it'd need a week just to try them all out. At this price, it's dynamite for the one-man show, but purists might want to try looking out for Yamaha's P80, which you can find on the street for about the $2,000 mark.

KEYBOARDS UNDER $3,000

Casio MZ-2000

RATING 7 **Price:** $2,199 **Contact:** Shriro **Phone:** (02) 9415 5555 **Web:** www.casio.com.au ✔ General MIDI ✔ Split keyboard option ✔ Dual voicing on upper and lower splits

If you're looking for maximum versatility from a keyboard to create virtually any complete full-mix track, the MZ-2000 is worth a look. And if you love having controls to burn, you'll love this keyboard. The 61 plastic keys are not weighted, but they do have both initial and after-touch velocity control, enabling the MZ-2000 to determine how the instrument voice should sound by your playing. It has 64-note polyphony, so you shouldn't run out of voice room. Every vendor seems to suggest its piano voices are digital samples of concert grand pianos, but the built-in two-way bass-reflex stereo speaker system certainly doesn't do the MZ-2000 justice. Drawbar organ controls are a neat feature and allow you to create everything from a Hammond B3 right through to a Leslie. And the built-in floppy drive allows you to store MIDI files you create (up to 16 channels). Basically, the keyboard works via voice banks. You can split the keyboard into two sections, with two voices going at any one time in each for a total of four in any combination you want. Add in the 17-track sequencer, 562 voices and 130 rhythms covering everything from Hip Hop to Big Band, and the MZ-2000 has it covered. All up, it's good value, but more for computer music creators than serious players.

Casio PL-40R

RATING 8 **Price:** $2,999 **Contact:** Shriro **Phone:** (02) 9415 5555 **Web:** www.casio.com.au ✔ 88 weight keys ✔ Full synthesiser capabilities ✘ Poor built-in speakers

By far the best we saw from Casio was this brand-new PL-40R, which has USB and traditional MIDI ports onboard. It features 88 full-length weighted keys and is finished in brushed aluminium and beechwood side panels. The pink lights embedded into all of the keys are tied in with the built-in learning system, but we found the bass and treble clef staves indicating the notes you're playing more useful. Two built-in speakers provide internal audio output, but they don't do the voice quality justice. Although Casio has a stand available for this one, it needs external speakers with a decent subwoofer to get full effect. It has some excellent piano voices — it doesn't have the versatility of the MZ-2000, but it sounds and feels right. The USB port allows your PC to control and record MIDI signals without messing around with MIDI cables. The key simulated-hammer action is similar to the P80. The onboard sequencer is more than passable with 16 tracks, 10 songs and up to 15,000 notes, and has punch-in and quantisation. It also has the features of a dedicated digital effects box, with 32 effects from flanging to reverb and delay. Stylish and slim, the new PL-40R is pretty good value.

Roland EM55

RATING 7 **Price:** $2,095 **Contact:** Roland Corporation Australia **Phone:** (02) 9982 8266 **Web:** www.rolandus.com ✔ 16-track sequencer ✔ Thousands of voices ✘ No USB

The EM55 features 61 touch-sensitive keys and a built-in 16-track sequencer, but the real pleasure for music makers will be the vast range of voice options — Roland lists the total at 3,559. Wisely, it's employed a rotary function wheel to enable you to dial them all up through the various basic voice bank switches. The fun feature is the so-called 'D-beam Controller' — basically, an infra-red beam that you interrupt with your hand to create tempo and play melodies. Of course, you can store everything on the built-in 3.5in floppy disk drive. Unfortunately, Roland still doesn't get the piano voices quite right in my opinion, but they sound better than the EM25. There's no USB port here, so that drags it behind the PSR-1100 a little, but MIDI-in and out ports still get you PC access if you need it. The speaker system isn't as good as the PSR-1100 or DGX300 and sounds boomy, as if it's trying too hard to create bass that isn't there. All up, if you're looking for that weird, original, kooky sound you can't find anywhere else, chances are you'll find it here.

Roland RD170

RATING 9 **Price:** $2,795 **Contact:** Roland Corporation Australia **Phone:** (02) 9982 8266 **Web:** www.rolandus.com ✔ Good gig keyboard ✔ Some excellent voices ✘ Weak piano voice

From the outset, we could tell this is a gig keyboard with lots of user-friendly and fast-change options. There's nothing worse when you're on stage and you have to fumble through menu selections. We must admit to having some fun with this keyboard and its unique 'boy band vocal' voice pleased some *PC User* staff and tortured others. Its full 88 weighted keys feel just slightly lighter in touch than Yamaha's P80. There are no internal speakers here, but I consider that a blessing. Its 64-note polyphony capabilities have it matching the others in the pack. The piano voices are passable, but not convincing. Our test unit was a prototype, but we don't expect any major changes with the units you see in the shop. One thing not to underestimate is the built-in AC power — you just need a standard IEC/computer-style power cable. If you're after a serious piano-style keyboard, go with Yamaha's P80, but for gig use, this should fit the bill.

1 PC USER TOP BUY

Yamaha P80

RATING 8 **Price:** $2,495 **Contact:** Yamaha Music Australia **Phone:** 1800 805 413 **Web:** www.yamaha.com ✔ Lightweight ✔ 88 full-size weighted keys ✔ Excellent piano voices

The P80 is the smallest full-sized weighted-key keyboard on the market, weighing in at just over 16kg. This one doesn't pretend to be anything it's not, but what it does do, it excels at. The weighted key action is excellent — if anything, maybe just a fraction too heavy, but similar to the Casio PL-40R. It only offers 24 voices in total (12 basic tones, each with one variation), half of which are piano variations from rock and jazz, through to classical and grand. It plays as close as you'll get to a real piano for this sort of money. Despite the price tag, you'll find it on the street for close to $2,000. Quarter-inch sockets are everywhere — stereo/right and left outputs, for headphone and sustain pedal, which is included. Apart from the voicings, the P80 has keyboard-split options and a funky double-bass tone. It's also 64-note polyphony, so you should never find yourself 'running out of room'. This would be a great option as a gig piano or for learning without being anchored down with something like a Clavinova. PCU

Rise of Nations

Julian Schoffel reviews the latest games for PCs and consoles.

RATING 10 Price: $89.95 Contact: Microsoft Phone: 13 20 58 Web: www.microsoft.com/games Classification: G(8+) ✓ Intuitive interface ✓ Deep and enthralling ✓ Excellent multiplayer component ✓ Great sound effects and music ✓ Silky smooth gameplay

The humble beginnings of my empire.

Rise of Nations (RON) was always going to be a big gamble. The chances of successfully translating the complexity of the turn-based strategy genre into the real-time format seemed remote at best. However, Big Huge Games has beaten the odds and come up with what can only be described as the most ambitious real-time strategy (RTS) game ever devised. It's not exactly revolutionary, but it certainly takes existing RTS gameplay conventions as far as they can possibly go — in my humble opinion, anyway.

In a nutshell, RON feels like a cross between Civilization and Age of Empires (AOE). In saying that, I don't mean that Rise of Nations is especially derivative, it just has the depth of the former and the seamless gameplay of the latter.

On the path to world domination.

OK, just kill anything wearing a blue skirt, boys!

In RON, you choose from one of 18 different civilisations and then attempt to forge an empire from scratch. After a bit of exploration, you proceed to harvest resources (lumber, food, metal, oil) and use the proceeds to improve and expand your empire. The game features numerous stages of development (epochs), which provide an evolutionary dynamic, similar to the 'ages' in AOE. RON also provides you with a staggering variety of possible research paths — in fact, far more than any other RTS offering I have played (and I've played a lot).

RON features many tactical innovations, but one of the most notable has to be its border concept. Unlike other RTS offerings, the game uses borders as a means of limiting where you can build. Borders also have a pronounced effect on troops when supply lines come into play late in a game.

The beauty of RON is in the interface. It would be easy for a game of this complexity to get mired down in an avalanche of menus and buttons, but thankfully, that's not the case. Brian Reynolds and crew have gone to great lengths to create a game that's surprisingly easy to control. Through the judicious use of a nifty pop-up help system and a huge selection of hotkeys, most players should get the hang of things in no time at all. Furthermore, many of the game's more mundane tasks can be automated, leaving you free to focus on important matters.

The visuals of RON are competent without being awe-inspiring. They certainly don't rival those of Age of Mythology or Command & Conquer Generals. However, their relative simplicity does have one positive side effect: the game runs very smoothly, even when there are a multitude of units filling the screen. I'd rather sacrifice a bit of eye candy for playability any day. The music and sound effects are also first rate.

Great effort has been put into the game's multiplayer component. You have a multitude of victory conditions to choose from and it's quite possible to play through a game in a little over an hour. There's also a multiplayer matchmaking option, allowing you to find opponents via the Net.

Rise of Nations is an enthralling and incredibly slick RTS game, but most importantly, it's also damned fun to play!

Drastically improved visuals I think you'll agree!

Tom Clancy's Rainbow Six 3: Raven Shield

RATING 9 Price: $89.95 Contact: Ubi Soft Phone: (02) 8303 1800 Web: www.raven-shield.com
Classification: MA(15+) ✓ Improved graphics engine
✓ Deep and involving ✓ New high-tech gadgets
✓ Great multiplayer component x Tired story-line

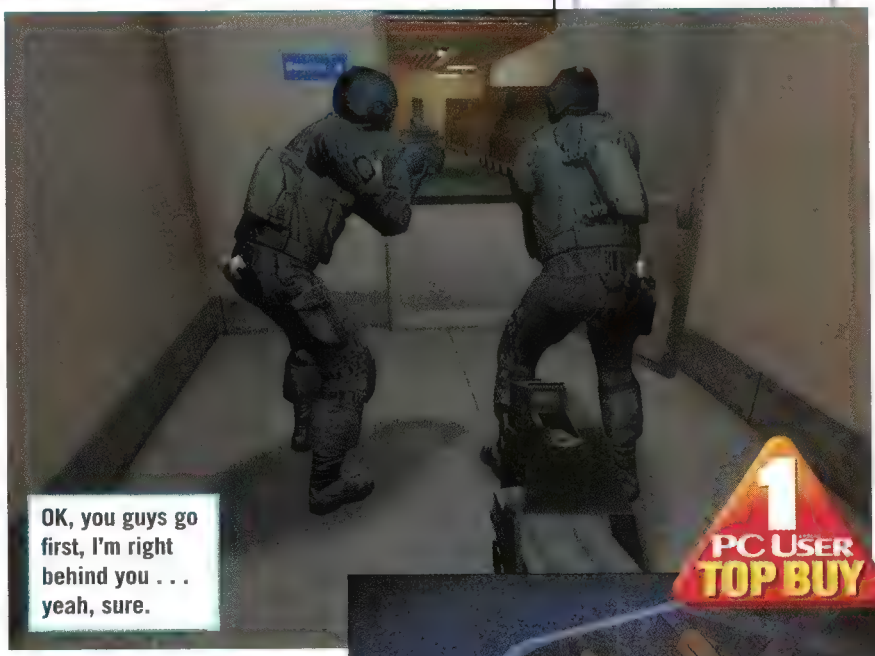
Rainbow Six 3: Raven Shield (RS) is the latest instalment of this much-loved team-based, tactical combat series. Apart from numerous gameplay tweaks and refinements, RS also features a brand spanking new graphics engine. The end result is one of the best tactical combat offerings I've ever played!

The story-line of RS is pretty contrived and involves the obligatory bunch of neofascist terrorists — but hey, it succeeds at tying the missions together, so who's complaining? Speaking of which, the game features a total of 15 single-player missions and nine multiplayer modes. Like previous instalments, RS places great emphasis on effective mission planning and there are some handy new tools to aid you in this process. These include improved hotkeyed squad commands and a nifty new 3D viewing perspective.

RS uses the Unreal engine to great effect, resulting in lavishly detailed locations chock-full of realistic-looking light and shadows. Character graphics are also crisp, clear and lifelike. Furthermore, the in-game physics have been beefed up, providing a host of spectacular (and rather unpredictable) death animations.

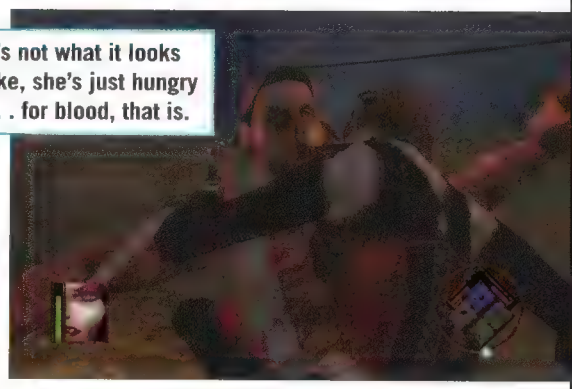
As you would expect, RS also includes a stack of new and rather lethal hardware for you to muck about with. Of these, the Heartbeat Sensor is probably the most interesting. Using this puppy, it's possible to locate opponents through walls and doors. While this sounds great in principle, it can also be quite risky, as I discovered after getting a little overzealous and gunning down a few team-mates by mistake . . . sigh.

It's all in the planning.



RS also includes a comprehensive multiplayer component where you can tackle single-player missions cooperatively, duke it out in Team Survival, with loads of other modes like Terrorist Hunt, Hostage Rescue and Bomb.

With its rich graphics, complex and enthralling gameplay, Rainbow Six 3: Raven Shield is an essential acquisition for fans of tactical combat. >>

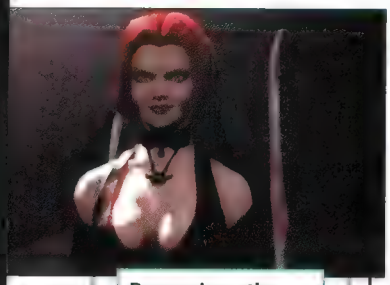


It's not what it looks like, she's just hungry . . . for blood, that is.

<<

BloodRayne

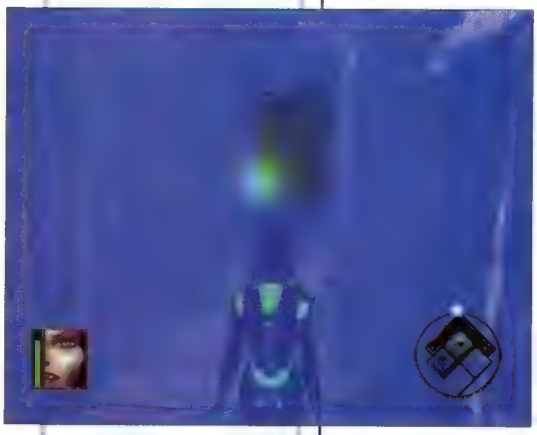
RATING 7 Price: $89.95 Contact: Vivendi Universal Phone: (02) 9978 7722 Web: www.bloodrayne.com Classification: MA(15+) ✓ Detailed 3D graphics ✓ Loads of fighting moves and weapons ✓ BloodRayne's special abilities ✗ Jerky frame rate ✗ Console-style savegame system



Bra and panties: traditional dress for female fighters apparently.

BloodRayne is a third-person perspective 3D action game in which you battle the iniquitous Nazis, along with a host of supernatural creatures including everything from zombies to vampires.

You control the character of Dhampir, a young woman who also happens to be half vampire. Dhampir is on a quest to avenge the rape of her mother by a vampire, which is a rather brutal premise for a game. At the start, Dhampir (aka Agent BloodRayne) is recruited by The Brimstone Society, an organisation dedicated to the elimination of all supernatural threats. Well, wouldn't you know it, the fiendish Nazis have been collecting powerful occult artefacts in an attempt to unleash evil upon the world and it's up to Agent BloodRayne to stop them.



Look out! Iridescent zombie at 12 o'clock!

Gameplay is quite solid and Agent BloodRayne has an impressive variety of moves, abilities and weapons at her disposal. As you might expect, she can wield everything from shotguns to grenade launchers and is also adept at martial arts-style fighting. However, it's her array of special abilities that really adds a twist to the game.

For starters, BloodRayne can use Blood Rage to move faster and inflict extra damage. She also has a handy Aura Sense ability, which allows her to detect enemies (even through walls) and locate mission objectives. Eventually, BloodRayne gets a special item which allows her to zoom in on far away objects and doubles as a sort of sniper mode (known as Extruded View). Her final ability is Dilated Perception, which functions a lot like 'Bullet Time' in the Matrix movies. Dilated Perception allows her to dodge bullets while enhancing her fighting ability.

The visuals are quite detailed, crisp and clear. Depending on your hardware, the game supports loads of fancy graphic features including bump mapping, reflective surfaces and advanced filtering. On the negative side, I did notice that the frame rate tends to get pretty jerky when the action hots up.

Unfortunately, BloodRayne was obviously created with console platforms in mind and it's only possible to save and load your games at the beginning of a level. Needless to say, this can get annoying when you get killed near the end of a particularly unforgiving level and have to start from scratch.

All in all, BloodRayne is a competent but not groundbreaking 3D action offering, which should appeal most to, you guessed it, adolescent males.

CSI: Crime Scene Investigation

RATING 6 Price: $89.95 Contact: Ubi Soft Phone: (02) 8303 1800 Web: http://csi.ubi.com/ Classification: M(15+) ✓ Features cast from TV show ✓ Great premise ✗ Audiovisuals a mixed bag ✗ Too easy ✗ Unintentional plot spoilers

Gruesome Grissom takes a call.

CSI: Crime Scene Investigation (CSI) is a graphic adventure based around the popular TV series of the same name. It also features the voices and likenesses of the main cast, which makes a nice change for a PC game. Like the TV show, the game revolves around the process of solving crimes by collecting and analysing forensic evidence. But while the central premise is great, the game falls down in the execution stakes.

In CSI, you assume the role of a rookie investigator at the Las Vegas cime lab. The game is split into five separate cases, spanning everything from arson and kidnapping to good, old-fashioned murder. In each of these cases, you are assisted by one of the characters from the TV show (ie. Gil Grissom, Catherine and so on). This sounds excellent in principle, but it ends up making the game too easy.

The fiendish array of investigative tools are one of the TV show's biggest drawcards. Not surprisingly, the game also places great emphasis on stuff like fingerprint dusters, UV lights (to illuminate bloodstains) and plaster casting kits. As you scan a crime scene for evidence, your co-investigator offers help and advice. Unfortunately, your virtual advisers are often a bit too helpful and occasionally spoil the mystery by revealing some vital (and unasked for) piece of information way too early.

The graphics of CSI are a bit of a mixed bag. While I commend the designers for using animated representations of cast members (instead of crap-looking full-motion video), the overall visual quality is pretty mediocre. The same applies to the game's audio — the voice acting in particular ranges from excellent (original cast) to downright appalling (extras).

CSI had the potential to be a great adventure game in the classic tradition of the genre. In the end, it's let down by some unintentional plot spoilers and a difficulty level that just isn't that challenging. >>

INCLUDES EXCLUSIVE LIMITED EDITION MESSENGER BAG*

*WHILE STOCKS LAST

STAR TREK

ELITE FORCE II

ENGAGE IN EPIC CONFLICT against a horde of alien invaders and other foes in the single player campaign. Deathmatch-style Multiplayer gameplay modes include Holomatch, Capture the Flag, Elimination, Action Hero and many more.

LEAD YOUR TEAM INTO BATTLE across numerous environments including: planet-side ruins, space stations, volcanic planets, alien colonies, treacherous swamps and other exotic locales.

FIRE AT WILL with weapons of devastating firepower including the Gatling Gun, Sniper Rifle and the deadly Quantum Burst. Irradiate your enemies with the experimental Radiation Disruptor.

For PC CD-ROM

Visit www.st-ef2.com for more information

TO FIND OUT MORE ABOUT ACTIVISION GAMES, REGISTER YOUR DETAILS ONLINE AT HTTP://EREG.ACTIVISION.COM.AU

G8+ | Paramount A VIACOM COMPANY | STARTREK.COM | ASPYR | ritual entertainment | PC CD ROM | ACTIVISION

TM, ®, & © 2003 Paramount Pictures. All rights reserved. Star Trek and related marks are trademarks of Paramount Pictures. This product contains software technology licensed from id Software, Inc. id Technology © 1999-2003 id Software, Inc. Game code © 2003 Activision, Inc. and its affiliates. All rights reserved. Published and distributed by Activision Publishing, Inc. Activision is a registered trademark of Activision, Inc. and its affiliates. Developed by Ritual Entertainment. All other trademarks and trade names are the properties of their respective owners.

ZEF17_PCU

activision.com

Welcome to the seedy world of the music industry.

If you want to be famous, you need to look good. Apparently, someone neglected to tell the bald guy with the beard.

The Sims: Superstar

RATING 7 **Price:** $49.95 **Contact:** Electronic Arts **Phone:** (02) 9264 0175 **Web:** www.thesims.com
Classification: M(15+) ✔ Celebrity theme ✔ Challenging ✔ Loads of new objects ✘ Venerable game engine ✘ Essentially more of the same

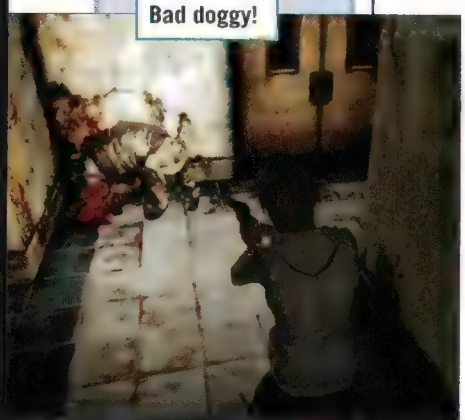
The Sims: Superstar is another expansion pack for the popular Sims series. The overall appeal of this series continues to elude me, but I have to confess that this latest offering is actually quite interesting. You get to guide your Sims through one of three exotic career paths: movie star, rock star or supermodel.

Of course, nobody said the road to stardom was easy and along the way, your Sims will have to negotiate a variety of obstacles. For starters, they'll have to jack up their charisma levels and make themselves more appealing physically. Then they'll need to network with other established celebrities to increase their fame level. As their fame increases, they'll also have to contend with the usual array of celebrity pitfalls, including bad write-ups in the tabloids and even the odd stalker.

The basic gameplay dynamics and presentation remain identical to other Sims offerings, although there are loads of new objects and a variety of fresh gameplay twists to fully exploit the celebrity theme. The task of juggling an ever-increasing workload with a busy social calendar is one of the game's toughest challenges.

If you're a Sims fan and enjoy TV shows like *Pop Stars*, then this should be right up your alley.

Fido, stop eating the postman! Bad doggy!



Silent Hill 3

RATING 6 **Platform:** PS2 **Price:** $99.95 **Contact:** Sony Computer Entertainment **Phone:** (02) 9324 9500 **Web:** www.konamityo.com/sh3/index_e.html
Classification: MA(15+) ✔ Scary ✔ Atmospheric visuals ✔ Great use of sound ✘ Stupid story-line ✘ Crap control system

Horror fans weaned on the likes of Resident Evil will probably have a ball with Silent Hill 3 (SH3), but the game is not without its share of problems. In the game, you assume the role of Heather, a young teenage girl marooned in a nightmarish world from which there is no apparent escape.

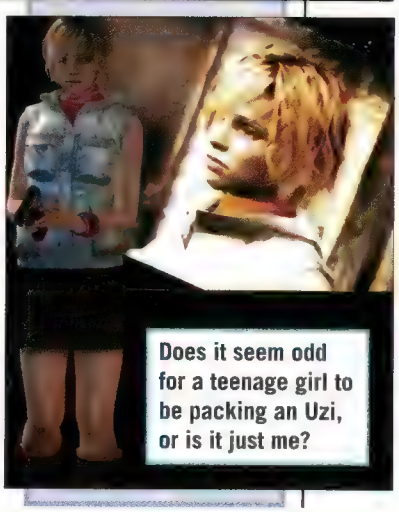
My first problem with SH3 involves the absurdly unrealistic main character. I mean, here we have a teenage girl who happens to be packing all manner of weapons and equipment including an Uzi for Christ's sake! Heather wanders around a series of increasingly grim and dangerous environments, all the while fending off attacks by some of the most hideous creatures imaginable. Come on guys; revealing the plot slowly may be an old narrative trick, but this is taking 'suspension of disbelief' a bit far.

While the story-line may verge on the ridiculous, the control system just outright sucks! This is one of those annoying games that relies on clunky D-pad controls for movement. To make matters worse, you have no direct control over the viewing perspective and the camera has a habit of switching at the last minute. The end result is you can rarely see what's in front of you.

Basic gameplay consists of moving Heather around the eerie gameworld, solving puzzles (find and combine items), killing monsters and trying to gain entry to the next area. Unfortunately, the latter is made rather tedious by the abundance of promising-looking doors, all of which turn out to be locked or (for some other obscure reason) inaccessible.

In keeping with the horrific subject matter, the visuals of SH3 are dark, grim and depressing. The game sports a variety of monstrous foes, many of which are downright revolting. But, being a horror game, this is probably a good thing. The Silent Hill series is famous for its effective use of spooky audio and SH3 is no exception. The combination of moody, dynamic soundtrack and uncanny sound effects certainly did a great job of scaring the bejesus out of yours truly, anyway!

If you can get past the dubious story-line and annoying control system, Silent Hill 3 is actually quite scary. So, if you're a horror buff, it's definitely worth a look, but I'd advise everyone else to steer well clear.



Does it seem odd for a teenage girl to be packing an Uzi, or is it just me?

READER SURVEY 2003

Let us know what you think of

AUSTRALIAN PC USER

AUSTRALIA'S TOP-SELLING TECHNOLOGY MAGAZINE

Simply by answering all our reader survey questions, you will go in the draw to WIN this fabulous BenQ FP791 LCD monitor, valued at $1,299.

This stylish 17in LCD monitor features a multilayer, superslim design. It delivers an ultrafast 16ms response time, high brightness, and has a high contrast ratio and SRS surround sound.

Please detach the fully completed survey and mail to:
PC User Research Department, GPO Box 5551, Sydney NSW 2001

Or complete the survey via the Web at www.pcuser.com.au/readersurvey.

Authorised under NSW Permit No TPL03/01547 SA 1G3/2148 ACT TPG3 226 NT NTJ3/1982
For full Terms and Conditions and the Privacy Notice please refer to www.pcuser.com.au/readersurvey

want to know what computer software interests

ease indicate, by ticking any of the boxes in the lumn, which of the following types of software you ike to see reviewed.
the second column, please tick any software which uld like to see on the cover CD.

	18a.	18b.
us	❑1	❑1
ls and other privacy/security software	❑2	❑2
owsers	❑3	❑3
clients	❑4	❑4
messaging	❑5	❑5
aring	❑6	❑6
t utilities (eg. download accelerators)	❑7	❑7
utilities (eg. backup, partitioning)	❑8	❑8
suites	❑9	❑9
ses	❑10	❑10
tation programs	❑11	❑11
sers (PIMs)	❑12	❑12
editors	❑13	❑13
o publishing software	❑14	❑14
tion software	❑15	❑15
thoring	❑16	❑16
erce software	❑17	❑17
imation	❑18	❑18
diting	❑19	❑19
ning software	❑20	❑20
d VCD authoring software	❑21	❑21
iting software	❑22	❑22
creation/production software	❑23	❑23
re and multimedia development	❑24	❑24
al finance and investment software	❑25	❑25
oftware (contact managers)	❑26	❑26
management	❑27	❑27
ftware	❑28	❑28
ecognition	❑29	❑29

there any other, or more specific, types of software u would particularly like to see reviewed in the ine? If so, please specify.

there any other, or more specific, types of software u would like to see included on the CD? If so, specify.

User mainly reviews Windows software and es Windows software on the cover CDs. Please e if you like to see more coverage of software for perating systems.

ve me more reviews and CD software for the ng operating systems:

	❑
osh	❑

please specify)

ou indicated Linux or Macintosh in the above on, please tell us what distribution and/or version rently use.

23. In this question, we want to find out what games, educational and leisure software interests you.
23a. Please indicate, by ticking any of the boxes in the first column, which of the following types of games and software you would like to see reviewed.
23b. In the second column, please tick which types you would like to see included on PC User's cover CDs.

	23a.	23b.
PC games	❑1	❑1
Xbox games	❑2	❑2
PlayStation2 or PSOne games	❑3	❑3
Nintendo GameCube games	❑4	❑4
GameBoy Advance games	❑5	❑5
Action games	❑6	❑6
Adventure games	❑7	❑7
Role-playing games	❑8	❑8
Strategy games	❑9	❑9
Simulation games	❑10	❑10
Driving games	❑11	❑11
Sports games	❑12	❑12
Puzzle games	❑13	❑13
Educational software	❑14	❑14
Reference software (eg. encyclopaedia)	❑15	❑15
Leisure or hobby software (eg. genealogy)	❑16	❑16

24. Are there any other, or more specific, types of games, educational or leisure software that you would particularly like to see reviewed in the magazine? If so, please specify.

25. Are there any other, or more specific, types of games or leisure software that you would prefer to see included on the CD? If so, please specify.

26. Still on the CD, please indicate, by ticking the appropriate boxes below, if you find of the following items useful or not. (1. Usually a waste of space 2. Sometimes useful 3. Usually very useful)

Full-version excommercial software	❑1	❑2	❑3
Trial software or shareware (limited use)	❑1	❑2	❑3
Freeware (no restrictions)	❑1	❑2	❑3
Video tutorials	❑1	❑2	❑3
Windows updates	❑1	❑2	❑3
Software patches	❑1	❑2	❑3
Playable game demos	❑1	❑2	❑3
Games trailers (preview videos)	❑1	❑2	❑3
Games patches, mods, etc	❑1	❑2	❑3
Screensavers, themes, etc	❑1	❑2	❑3

27. PC User reviews products and services as well as the traditional computer products listed in the questions above.
27a. Please indicate, by ticking any of the boxes in the first column, if you want more coverage of any of the following types of products.
27b. In the second column, please tick any of the products which you feel are covered too much in PC User.

	27a.	27b.
Dialup ISPs	❑1	❑1
Broadband services	❑2	❑2
Web sites	❑3	❑3
Home theatre products (eg. TVs, DVD players, surround sound systems)	❑4	❑4
Hi-fi	❑5	❑5
'Smart home' technology (eg. home security)	❑6	❑6
Game consoles	❑7	❑7
Personal audio gear (eg. MP3 players)	❑8	❑8
Mobile phones	❑9	❑9
Computer books	❑10	❑10
DVD movies	❑11	❑11

28. Are there any other, or more specific, types of technology products and services that you would particularly like to see reviewed in the magazine? If so, please specify

29. This question relates to advertisements in the magazine and promotional software on the cover CDs. To what extent do you agree with each of the following statements? (1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree)

PC User has advertisements that are relevant to me.
❑1 ❑2 ❑3 ❑4

I take notice of the products advertised in PC User.
❑1 ❑2 ❑3 ❑4

I have made a purchase after seeing a product advertised in PC User.
❑1 ❑2 ❑3 ❑4

I have trialled software from the PC User CD.
❑1 ❑2 ❑3 ❑4

Trialling software from the PC User CD has influenced me to purchase a particular software product.
❑1 ❑2 ❑3 ❑4

YOUR VERDICT

30. Please rate PC User on each of the following media.

PC User magazine (not the CDs)
Poor ❑1 Fair ❑2 Good ❑3 Excellent ❑4

The PC User cover CDs
Poor ❑1 Fair ❑2 Good ❑3 Excellent ❑4

The PC User Web site
Poor ❑1 Fair ❑2 Good ❑3 Excellent ❑4

31. If you could make one improvement or change to PC User magazine (not the CDs), what would it be?

32. If you could make one improvement or change to PC User's cover CDs, what would it be?

33. If you could make one improvement or change to the PC User Web site, what would it be?

GO TO PAGE 3 >

PC USER

WELCOME TO THE PC USER READER SURVEY

You can help shape the future of PC User by taking the time to answer the following questionnaire.

1. How long have you been reading PC User?

- Less than six months
- Six months to a year
- One to two years
- Two to four years
- More than four years

2. How often do you read PC User?

- I read it every month
- I read it most months
- I read it occasionally

3. Do you mostly read it . . .

- For personal interest
- For work
- Both

4. On average, how many times would you refer to each copy of PC User?

- Once
- Two to four times
- At least five times

5. How do you usually get your copy of PC User?

- I have a personal subscription
- My workplace subscribes
- I buy it from a newsagent/supermarket
- A friend passes it on to me

6. What type of promotion would most encourage you to become a subscriber to PC User?

- A chance to win PC hardware
- A chance to win software
- A chance to win non-IT products such as a holiday or car
- A free gift such as a baseball cap or software
- A reduced price
- Bonus issues
- I'm not interested in subscribing

7. How often do you refer to past issues of PC User?

- Often
- Occasionally
- Never

8. On average, how many times would you load each PC User cover CD?

- Hardly at all
- Once or twice
- At least three times

9. Do you keep PC User cover CDs for future reference?

- Yes
- No

10. What other computing/technology publications do you regularly read?

- APC
- Atomic
- NetGuide
- PC Authority
- PC Powerplay
- PC World
- Technology and Business
- The Australian IT section
- Other (please specify) _____

11. On average, how often do you visit the PC User Web site?

- Every day
- A few times a week
- Once every one to two weeks
- Once a month or less
- Never visited

WHAT INTERESTS YOU IN PC USER

12. In this question, we want your opinion on the various types of stories which are, or could be, included in PC User.
12a. Please indicate, by ticking any of the boxes in the first column, which of the following types of stories you would like more of in PC User.
12b. In the second column, please tick any of the stories that you think we cover too much. (We'll assume the coverage is about right if you don't tick a box.)

	12a.	12b.
Reviews of the latest computer hardware and software	❑1	❑
Reviews of noncomputer technology (eg. home theatre)	❑2	❑
Large comparisons of computer hardware and software	❑3	❑
Advice for purchasing home computer hardware and software	❑4	❑
Advice on technology solutions for small business	❑5	❑5
Tips and tutorials for operating systems	❑6	❑6
Tips and tutorials for software	❑	❑7
Tips and tutorials for hardware	❑	❑8
Opinion	❑	❑
Readers' stories and experiences	❑	❑10
IT news	❑	❑11

13. In this question, we want your opinion of the various help and tutorial topics covered in PC User.
13a. Please indicate, by ticking any of the boxes in the first column, if you want more of the following help and tutorial topics in PC User.
13b. In the second column, please tick any of the help and tutorial topics that you think we cover too much. (We'll assume the coverage is about right if you don't tick a box.)

	13a.	13b.
Windows XP	❑1	❑1
Windows 98/Me	❑2	❑2
Windows NT/2000	❑	❑3
Windows networking	❑	❑
Linux	❑	❑
Hardware/PC upgrading	❑	❑
Internet (eg. browsing, email tips)	❑	❑
Viruses and security	❑8	❑
Making movies	❑8	❑
Sound and music making	❑	❑
CD and DVD burning	❑	❑
Microsoft Office	❑	❑
Graphics and design	❑12	❑
Web authoring	❑	❑
Software development	❑14	❑14

If you want more coverage of software development, please specify platform. _____

14. Are there any other, or more specific, types of help and tutorial topics that you would particularly like to see covered in PC User? If so, please specify.

15. PC User reviews a lot of products both individually and in product comparisons, but we want to know what interests you.
15a. Please indicate, by ticking any of the boxes in the first column, which of the following types of computer hardware products you would like to see reviewed.
15b. In the second column, please tick any of the following products that you intend to purchase in the next 12 months.

	15a.	15b.
Desktop PCs	❑1	❑1
Notebook PCs	❑2	❑2
Handheld PCs	❑3	❑3
Macintosh computers	❑4	❑4
Servers	❑	❑
Business networking hardware	❑	❑
Internet-sharing devices	❑	❑
Printers (for home)	❑	❑8
Printers (for business)	❑	❑9
Scanners	❑	❑
Digital cameras	❑	❑
Digital video cameras	❑	❑
CD burners	❑	❑
DVD burners	❑	❑
Other personal storage devices (eg. USB keys, external hard drives)	❑15	❑
Tape and other business backup devices	❑16	❑
Hard disk drives (internal)	❑17	❑
Motherboards and processors	❑18	❑
PC cases and power supplies	❑	❑
Graphics cards	❑	❑
Monitors	❑	❑
Keyboards and mice	❑	❑
Speakers	❑7	❑
Soundcards	❑	❑

16. Are there any other, or more specific, types of computer hardware products that you would particularly like to see reviewed? If so, please specify _____

17. Are there any other, or more specific, types of computer hardware products that you intend to purchase within the next 12 months? If so, please specify. _____

18. We
you.
18a. P
first co
would
18b. I
you wo

Antivir
Firewa
Web br
Email
Instant
File sh
Interne
System
Office
Databa
Presen
Organi
Image
Deskto
Illustra
Web au
Ecomm
Web ar
Video e
CD bur
DVD ar
WAV ed
Music
Softwa
Person
CRM s
Project
OCR so
Voice r

19. Are
that yo
magaz

20. Are
mail yo
please

21. PC
include
indicat
other c

Yes, gi
followi
Linux
Macint

Other (

22. If y
questi
you cu

BUYING AND USING TECHNOLOGY

34. How would you describe your general level of expertise in computing?

Beginner ❑1 Intermediate ❑2 Advanced ❑3

35. Do you consider yourself an expert in at least one field of computing?

Yes ❑
No ❑

If so, what is that field of computing? _____

_____

36. In this question, we want your opinion about some technology brands.
36a. Please indicate, by ticking any of the boxes in the first column, if you have ever bought a product with any of the following brands.
36b. In the second column, please tick any of the brands that you would consider buying in the future:

	36a.	36b.
Acer	❑1	❑1
American Power Conversion	❑2	❑2
Apple	❑3	❑3
ASUS	❑4	❑4
BenQ	❑5	❑5
Brother	❑6	❑6
Canon	❑7	❑7
Capax	❑8	❑8
Creative Labs	❑9	❑9
Dell	❑10	❑10
D-Link	❑11	❑11
Epson	❑12	❑12
Fujitsu	❑13	❑13
Gigabyte	❑14	❑14
Hewlett-Packard/Compaq	❑15	❑15
IBM	❑16	❑16
Imation	❑17	❑17
Intel	❑18	❑18
Kodak	❑19	❑19
Microsoft	❑20	❑20
Mitsubishi	❑21	❑21
MSI	❑22	❑22
Netgear	❑23	❑23
Network Associates	❑24	❑24
Optus	❑25	❑25
Pacific Internet	❑26	❑26
Panasonic	❑27	❑27
PowerQuest	❑28	❑28
Samsung	❑29	❑29
Sony	❑30	❑30
Symantec	❑31	❑31
Telstra	❑32	❑32
Ulead	❑33	❑33
Verbatim	❑34	❑34

37. Is there any one brand, either from the above list or not, that you rate particularly highly? If so, please specify. _____

_____

38. How much would you be prepared to pay for a good PC?

$0 - $1,500 ❑
$2,000 - $2,599 ❑2
$2,500 - $2,999 ❑
$3,000 - $3,499 ❑3
$3,500+ ❑

39. How often do you access the Internet?

Less than once a week ❑1
Once or twice a week ❑
At least once a day ❑3

40. Do you have broadband Internet access?

At home Yes ❑ No ❑
At your workplace Yes ❑ No ❑2

41. Do you intend to get broadband in your home in the next 12 months?

Yes ❑
No ❑

42. How often do you make the following financial transactions online? (1. Never 2. Occasionally 3. All the time)

Pay personal bills and bank online	❑1	❑2	❑3
Make personal investments	❑1	❑2	❑3
Make business transactions	❑1	❑2	❑3
Purchase goods or services with personal credit card	❑1	❑2	❑3
Purchase (personal) goods or services by another means	❑1	❑2	❑3

If you purchase goods by a means other than credit card, please specify. _____

_____

_____

_____

43. To what extent do you influence decisions to purchase IT and computing products at your place of work?

I am the sole decision maker ❑
I am a joint decision maker ❑
I influence the decisions ❑
I do not influence the decisions at all ❑

44. If you are a decision maker or have some influence on IT purchasing at your work, how much does your business purchase each year on average?

Less than $9,999 ❑
$10,000 - $24,999 ❑2
$25,000 - $49,999 ❑3
$50,000 - $99,000 ❑4
$100,000 - $499,999 ❑5
Over $500,000 ❑

45. If you are a decision maker or have some influence on IT purchasing at your work, do you intend to make a major IT purchase or upgrade for your business in the next 12 months?

Yes ❑
No ❑

If so, please specify that purchase or upgrade. _____

_____

_____

_____

_____

ABOUT YOU

46. Are you . .

Male ❑
Female ❑

47. Age

Under 18 ❑
19 - 24 ❑
25 - 34 ❑
35 - 49 ❑
50 - 64 ❑
65 or older ❑

48. Are you

Working full time ❑
Working part time ❑
Self employed/small business owner ❑
Student ❑
Retired ❑
Not currently working ❑

49. What is your income (before tax)?

Less than $20,000 ❑
$20,000 - $29,999 ❑
$30,000 - $39,999 ❑
$40,000 - $49,999 ❑
$50,000 - $59,999 ❑
$60,000 - $69,999 ❑
$70,000 or more ❑

50. How many employees work in your company?

1 - 9 ❑
10 - 49 ❑
50 - 99 ❑
100 - 199 ❑
200+ ❑

51. Do you work in the computing/IT industry,

Yes ❑
No ❑

52. What is your postcode? ❑❑❑❑

To enter the competition, please provide the following details.

Name: _____

_____

Address: _____

_____

_____

Phone number: _____

_____

Email: _____

Would you be happy for us to contact you for any future research initiative?

Yes ❑
No ❑

PC USER

Baldur's Gate: Dark Alliance

RATING 8 **Price:** $99.95 **Contact:** Vivendi Universal **Phone:** (02) 9978 7722 **Web:** www.interplay.com/bgda/ **Classification:** M(15+) ✔ Slick graphics engine ✔ Fast and fun ✔ Excellent control system ✔ Top-notch audio ✘ A tad on the shallow side

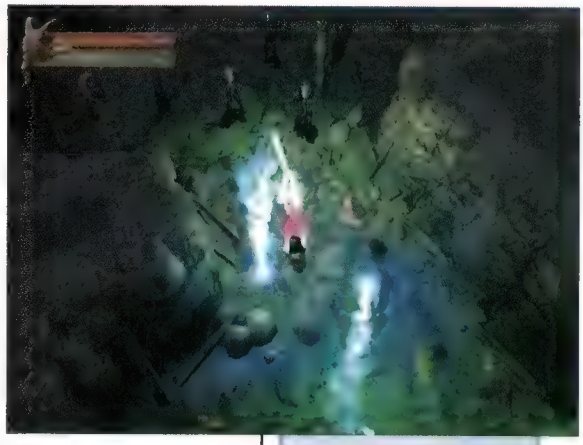
Anyone who has played one of the PC incarnations of the Baldur's Gate series will inevitably find Baldur's Gate: Dark Alliance (DA) for Xbox a bit on the shallow side. That said, it's still great fun, even if it does put the emphasis on Diablo-style action in an effort to make the game more accessible.

At the start of DA, you pick from one of three available character classes: Archer, Fighter or Sorceress. Although the game is based around the third edition D&D rules, don't expect the level of depth and complexity that characterised Baldur's Gate offerings on the PC platform.

DA's control system is excellent: you use the two sticks on the Xbox gamepad for movement and camera rotation, the action buttons to cast spells, jump and attack, the D-pad to control spell or item selection, and the triggers to drink potions. All in all, it works a treat and should become second nature after a half an hour or so.

In DA, you spend much of your time negotiating dungeon environments while attempting to dispatch a multitude of D&D-inspired foes. The sheer number of opponents can make portions of the game rather daunting, but thankfully, DA includes loads of convenient savegame locations and a handy Recall potion, which functions like the Town Portal scrolls in Diablo. The 3D visuals of DA are fantastic: the in-game environments feature plenty of detail; there are lots of pretty lighting effects accompanying spell casting; and the monsters and NPCs (nonplayer characters) also look great. Music and sound effects are of a similar calibre, and for once, the voice acting doesn't suck!

If you own an Xbox and salivate at the prospect of playing a Diablo-style action game with a few role-playing elements thrown in for good measure, then Baldur's Gate: Dark Alliance is a very appealing option.



The 'unleaded' version of Baldur's Gate.

Shocking behaviour.

Return to Castle Wolfenstein: Tides of War

RATING 9 **Price:** $99.95 **Contact:** Activision **Phone:** 1902 263 555 **Web:** www.activision.com **Classification:** MA(15+) ✔ Extra prequel missions ✔ Stunning 3D visuals ✔ Classic twitch shooter gameplay ✔ Xbox Live support ✘ Dodgy story-line

Return to Castle Wolfenstein: Tides of War (TOW) is really just a port of the excellent 3D shooter released on PC a year and a half ago. However, Xbox owners do get a few extra missions, which take place shortly before the beginning of the PC version — a sort of prequel minicampaign, if you will.

For those of you who are new to the Castle Wolfenstein series, the lead protagonist is one BJ Blazkowicz, a tough son of a bitch, very much in the Clint Eastwood style of hero. The game is set in 1943 and Blazkowicz is working for the top secret OSA, a covert operations unit trying to thwart the Nazis. Funnily enough, the central story-line is very similar to another game reviewed in this issue, BloodRayne. Yep, once again you have to stop the Nazis from using the occult to release evil forces upon the world.

Like the PC version, the 3D visuals of TOW are absolutely top-notch. There are even a few extra trimmings like enhanced water and reflection effects. The sound effects and dialogue are also uniformly excellent with plenty of *Hogan's Heroes*-style German accents to provoke the odd chortle.

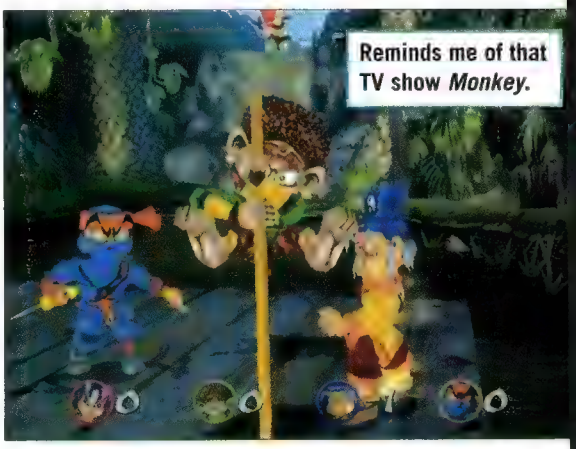
In the realm of 3D action games, no-one can beat id Software, and TOW is one of the best twitch shooters on Xbox. You have oodles of firepower to choose from and enemy AI (artificial intelligence) is also pretty solid. While I still prefer the mouse/keyboard combination for controlling games of this type, the Xbox pad does a passable job.

TOW also has Xbox Live capabilities, so anyone hooked up to the online service can duke it out with up to 15 other players. If you own an Xbox and have a penchant for 3D shooters, then Return to Castle Wolfenstein: Tides of War is a must-have. >>

You've sinned, my son. So, it's two Hail Marys and 30,000 volts!

1 PC USER TOP BUY

Top-notch 3D action on the Xbox.



Kung Fu Chaos

RATING 7 Price: $99.95 Contact: Microsoft Phone: 13 20 58 Web: www.xbox.com.au Classification: G(8+)
✓ Crisp visuals ✓ Funky 70s music ✓ Light humour
✗ Pretty brainless ✗ Simplistic combat

Kung Fu Chaos is a humorous homage to kung-fu flicks of the 1970s. The game is essentially a straightforward arcade fighting offering, but the colourful visuals, wacky cut scenes and zany sound effects add slightly to the fun factor. Incidentally, I just realised a life-long dream by using 'wacky' and 'zany' in the same sentence.

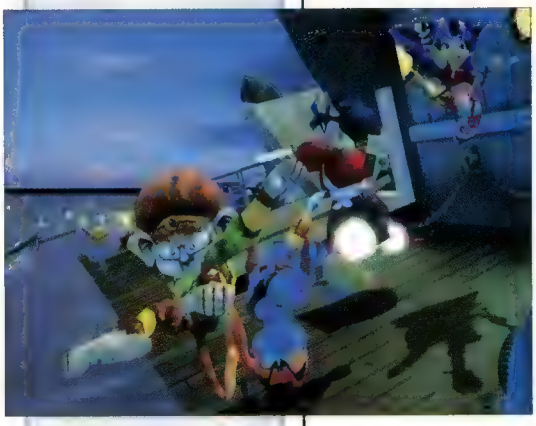
In keeping with the movie theme, you select actors rather than generic characters. These actors are then given the opportunity to impress a virtual director by performing all manner of startling moves in various combat sequences.

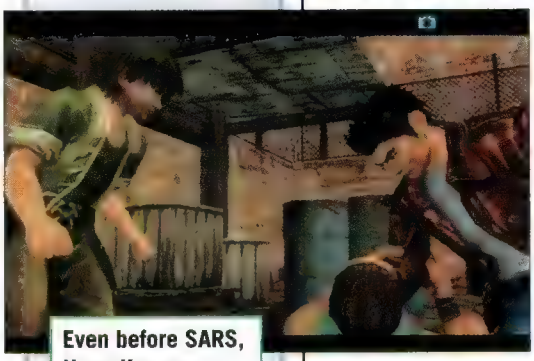
Kung Fu Chaos features six main playing modes. These include Ninja Challenge (where you select an actor and face off against hordes of ninjas), Battle Game (where you fight your co-stars), Championship (where you slug it out through 12 rounds of kung-fu mayhem), Miniseries (in which you attempt set challenges), Freestyle (where you spar in an open arena) and Rehearsal (where you receive fighting lessons).

The visuals of Kung Fu Chaos are colourful and quite detailed. The various characters all have unique fighting styles and there are also plenty of snazzy lighting effects to spice things up even further. I found the little director who appears throughout the game to be a royal pain in the arse, but hey, you just have to click a button to get rid of the annoying little punk. In terms of audio, the game's strongpoint is the daggy (but strangely endearing) 70s tunes that accompany the action.

Gameplay is pretty easy to control and most players should get the hang of things quickly. The game has a sort of tutorial mode, which goes through all the available combos and abilities for each character. As is typical with games of this type, it all comes down to timing and reflexes.

If you have a soft spot for 1970s kung-fu flicks and don't mind a bit of brainless arcade action, then Kung Fu Chaos is worth a look.


Cute homage to 1970s kung-fu flicks.


Even before SARS, Hong Kong was a dangerous place.

Shenmue II

RATING 7 Price: $99.95 Contact: GameNation Phone: 1800 060 605 Web: www.xbox.com.au Classification: M(15+) ✓ Diverse gameplay ✓ Lots to see and do ✓ Solid story-line ✗ Slow pace ✗ Simplistic visuals

Shenmue II is an interesting game for a number of reasons. First, its gameplay can't easily be categorised, because it spans a number of different genres: part fighting game, part action and part adventure.

In fact, Shenmue II could almost be described as a role-playing offering. In case you never played the first game, Shenmue II also includes a special DVD movie, which summarises the story-line of Shenmue.

In Shenmue II, you control the character of Ryo Hazuki as he seeks to wreak vengeance on those responsible for his father's death. The game is set in a big, bustling, virtual representation of Hong Kong, and quite a convincing one at that. No small feat, I think you'll agree!

Basic gameplay consists of navigating Ryo around the city while trying to pick up clues relating to his father's death. The game switches between adventure-style sequences, in which Ryo can converse with NPCs (nonplayer characters), and action sequences. The latter are split into two distinct formats: the first is where Ryo performs a specified action according to what's happening onscreen, and the second is where the game switches into traditional fighting game mode.

A handy map makes the process of moving around Hong Kong a bit easier, but it's still a huge place and there's loads to see and do. Apart from exploring his surroundings, Ryo also needs to earn some cash.

Money can be earned in a variety of ways including manual labour, prize fighting and gambling. While it adds an element of realism, I found this part of the game to be a tad boring.

In terms of visuals, the game looks good, but not awe-inspiring. The sound effects and music are also a little hokey, with some God-awful dialogue thrown in for good measure.

If you don't mind playing at a fairly leisurely pace and you're intrigued by the prospect of an action/adventure hybrid, then Shenmue II is certainly worth checking out. PCU

Ryo faces off against some 80s street punks.

Techware

The *PC User* team tests the latest home entertainment gadgets.

Rock MS-802 5.1 Home Theatre System

RATING 8 Price: $490 Contact: Anyware Computer Accessories Phone: (02) 9879 5788 Web: www.anyware.com.au

You may not have heard of the Rock brand name, but they're one of the largest no-name PC speaker manufacturers in Taiwan. In fact, you've probably seen a set of their speakers at your local computer market selling for a bargain price. Unlike other budget brands where one look can put you off buying a 5.1 setup, the MS-802 has an aesthetically pleasing design that can be mistaken for an expensive package. All 25W satellite speakers are encased in aluminium and connect to a 90W active subwoofer. There are aluminium tube stands for the front speakers, with adjustable pole stands for the rear. Testing with *Judge Dredd* and *Pearl Harbor* provided good surround imaging and bass response from all channels, although the front and rear satellites do need a touch more treble. A digital input on the active sub would have also been a good addition. Overall, the system is well balanced. They may not blow you away, but they'll certainly do the job in a living room.
— **Joshua Rodriguez**

Aiptek PocketDV3100

RATING 7 Price: $299 Contact: Capax Technology Phone: (02) 9648 4977 Web: www.aiptek.com.tw

We last looked at the Aiptek DV multifunction camera in our February 2003 issue. Just when you thought you might buy the product, Aiptek has released its successor: the PocketDV 3100. Thankfully, most of the changes have been cosmetic, but the main update is the still picture resolution. The new DV3100 captures at 2.1 megapixels and image quality is comparable to other digital cameras in its price range. The camera can also capture at 3.1 megapixels through interpolation. Most of the other features are the same as the original, such as the 10fps movie capture, the button layout and flip-out LCD. Its new cosmetic upgrades include a metal lens bezel, automatic power on when the monitor is flipped opened, and a sharper 1.5in LCD. The DV3100 now also comes with a 32M CompactFlash card and a canvas belt pouch. It still feels like a toy, but it's priced well at $299. All up, it's not a bad camera if you can handle the campy gold finish, but the movie capture resolution still needs much improvement.
— **Joshua Rodriguez**

Targus Noise Reduction Travel Headphones

RATING 7 Price: $149 Contact: Targus Australia Phone: 1800 641 645 Web: www.targus.com.au

Noise-cancelling headphones have been around for some time, but they've generally only been seen in the aviation industry. Targus' new travel headphones now give road warriors the same benefits as pilots — well, almost. These headphones run on two AAA batteries for about 100 hours and, even with no audio plugged in, you can hear the noise-cancelling effect just by putting them on your head and turning them on. Comfort and fit don't reach the 'unsurpassed' Targus claims, and ideally, it would have been better if they fitted around your ears for better noise cancelling, rather than just sitting on top of your ears. However, they do work, so they could be just the ticket for reducing the drone of human voices!
— **Darren Yates** PCU

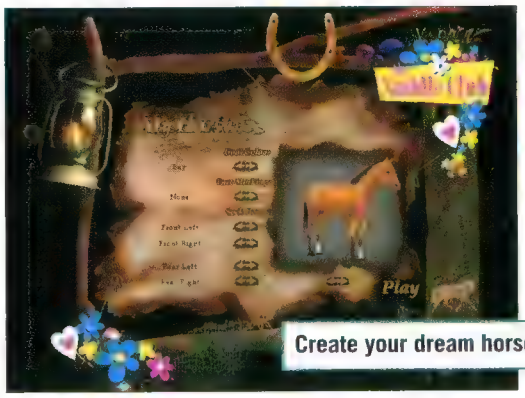
TDK IMASPEAKER MONO

RATING 7 Price: $29.95 Contact: TDK Phone: 1300 305 835 Web: www.tdk.com.au

Funny name, but not a bad idea — TDK's new Imaspeaker, short for 'integrated music accessory speaker', combines a CD carry case with a built-in mono speaker. There's no built-in volume control, as it relies on the audio source for that, and it runs on two AA cells. It also features a power switch and room to hold 10 CDs. Don't expect too much bass from it, but the slimline internal speaker, based on TDK's NXT speaker technology, is at least one solution when headphones aren't enough. Priced at $29.95, it's reasonable value and there's a stereo version (twice the length) for $49.95. At any rate, it's better than the Olympia SoundBug we reviewed in February 2003.
— Darren Yates

The Saddle Club: Willowbrook Stables

RATING 7 Ages: From eight years Price: $29.95
Contact: GameNation Phone: 1800 060 605
Web: www.funkidsgames.com ✓ Comprehensive gameplay ✓ Female role model ✗ Slow response to keyboard commands ✗ Graphics a bit disappointing

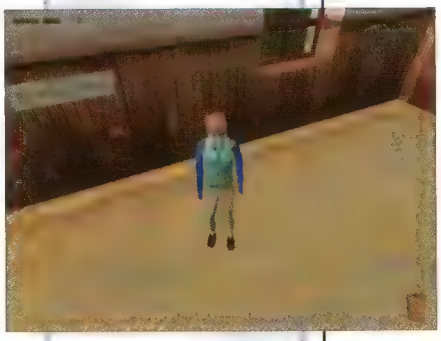


Create your dream horse.

First came the books, then the TV show, and now the PC game. If you're a fan of the first two genres and all things horsey, then you should have a lot of fun with this computer incarnation. In this adventure, a letter comes inviting the Saddle Club girls for a holiday at Willowbrook Stables on Coventry Island, but only one girl and her horse can go. Needless to say, the character you choose to play in the game — Stevie, Lisa or Carole — is the one that is chosen. You also get to customise your horse's colour and markings. When you arrive at the island you are greeted by the stables' owner who is off to talk to developers who want to take over the stables and tear them down for redevelopment. It's your mission to help save the stables by uncovering the mystery, using the clues you find around the island. And be warned: the island is mighty big! You'll get some clues by speaking with the people you meet along the way. All clues are kept in your diary, which can be accessed at any time to find out what to do next. However, others are trying to solve the mystery as well, and if they beat you to the solution, the stables are sunk. While you're on your mission, you also have to take good care of your horse by grooming and feeding it and completing various tasks and activities for which you'll get points. These points can be used to unlock secret pictures in the diary. The game depicts night and day, so when you see that it's getting late, you need to get back to the stables and take care of your horse's needs and bed it down for the night.

Movement is controlled via the keyboard and on our system (which more than met the recommended system requirements) the response was sluggish and unresponsive to say the least. And even with the settings optimised, the graphics don't quite live up to the promise of the opening scenes. Despite this, there is a lot of depth to the game. A final piece of advice: make sure you read the manual or you won't have a clue what you're doing.

Get all your horse's gear from the tack room.



Dora the Explorer: Backpack Adventure

RATING 8 Ages: Three to five years Price: $29.95
Contact: GameNation Phone: 1800 060 605
Web: www.funkidsgames.com ✓ Ethnic heroine ✓ Incorporates learning foreign language ✗ Packaging

Help Backpack find objects.

If you are a fan of the kids' television series *Dora the Explorer*, you'll have lots of fun with Dora and her friends Boots the monkey, Benny the bull, Isa the iguana and Tico the squirrel in this game. It's nice to see another female role model for littlies make it onto the computer. Even better, Dora comes from another culture and is bilingual, which gives her even wider appeal. Simple Spanish words are introduced during the game and become more prevalent as you move up through the levels. At this age, kids relish exposure to new things and are very receptive to this type of learning experience.

In this adventure, Dora and Boots have to return Dora's books to the library, but there are lots of distractions along the way. You'll find a map of the route to the library in the backpack and you store objects in it that you need to complete your tasks along the way. First, you have to collect all the books by matching their colours to put in the backpack to take to the library. Next, you have to help plant seeds while you stop Swiper the fox from stealing things from the garden. When you come to the bridge, you need to match colours and shapes to pay the troll's toll and cross over. When you finally get to the library, you need to match objects with a particular theme to chose new books. There are three levels of difficulty in the activities and the graphics are bright and crisp. There are also little surprise animations when you click on different parts of the screen in each activity. When each activity is completed, you get a sticker for your online sticker book. With the stickers, you can make bright, printable pictures.

Unfortunately, as seems to be the go lately, the CD-ROM is housed in a paper envelope, which is nowhere near robust enough for use by the target age group. How about some DVD-style packing, guys, instead of a lonely little disc rattling around inside that big cardboard box?

Gail Lipscombe has something for every taste and age this month.

Jay Jay: Sky Heroes to the Rescue

RATING 8 **Ages:** Three to seven years **Price:** $29.95
Contact: GameNation **Phone:** 1800 060 605
Web: www.brighterchild.com ✓ Appealing characters ✓ Good graphics ✓ Packaging ✗ Youngest players would not know alphabet to complete tasks

That cute little jet plane, Jay Jay, is back in the air again, this time to save the world's one and only sparkleberry tree from dying. To do this, Jay Jay has to find out the five main ingredients that make healthy plants — water, sunlight, good soil, nutrients and clean air — to bring the sparkleberry tree back to its former brilliance. The game is a novel way of getting children to understand natural science in a way that's relevant and is backed up with separate video sequences on how plants grow. You have to go to five locations in search for a remedy for the ills of the sparkleberry tree.

First port of call is the castle in the sky, where you have to identify the beginning letters of words to draw sky pictures to make the Cloud King happy so that he'll make it rain. On Pangabula Island, you have to put lettered birds in their correct place in the alphabet to scare them away so they don't block out the sunlight from the sparkleberry tree. At the quarry, you have to help Revvin' Evan to get just the right mix of soils by matching colours and objects. At Tarrytown Hardware, you have to catch letters in a bucket to spell out words so that you can get plant food to feed the sparkleberry tree. You also have to navigate a helicopter through a maze and bust the smog clouds to make the air clean again. In your travels, you'll find that there's also a secret ingredient to growing a healthy plant, and that's love and caring. Once you've restored the sparkleberry tree back to health, you can use the sparkleberries to play music that can be recorded and played back. The game has three levels of difficulty to cater for a range of ages and abilities, and the story-line, bright graphics and appealing characters work nicely together to deliver a good environmental message.

If you're a fan of Jay Jay's TV show, you're sure to have a lot of fun with this game, not to mention developing your spelling skills and learning a bit of natural science along the way.

Put the lettered birds in their correct spot in the alphabet.

Click on all the letters that begin this word.

Tonka: Search & Rescue 2

RATING 7 **Ages:** Four to seven years **Price:** $29.95
Contact: GameNation **Phone:** 1800 060 605
Web: www.funkidsgames.com ✓ Good graphics ✗ Not very exciting

Tonka Joe is back with some rescue missions for aspiring young emergency workers. There are four rescue stations — fire, police, water and mountain — with activities and rescue missions. In the police mission, you have to unsnarl a traffic jam caused by a family of ducks trying to cross the road. You do this by directing the traffic, sending cars in one direction and trucks in another, and making sure that the ducks cross the road safely. When the ducks are on the grassed area, you have to dig them a pond to live in and create a park around it. At the fire station, you have to clean the rescue vehicles and attach their safety equipment so that they're ready for action when needed. You also have to help Tonka Joe put on all his rescue gear correctly. When the alarm sounds, you have to drive the fire truck to the forest to put out a fire. When the fire is out, you need to clear all the debris from the bridge then rebuild the area by putting up a lodge, log cabins and other facilities. In the water rescue, you have to round up the boats torn loose from their moorings during a storm and manouevre them into their correct moorings by matching the number on the wharf with the number on the boat. You then have to build a breakwater so that the boats have a safe harbour in any future storms. In the mountain rescue, you have to rescue hikers stranded by a broken bridge in your helicopter, then rebuild the bridge. When you complete an activity for the first time, you earn a certificate and you can print out an image of the rescue vehicle. You are awarded medals when you complete missions. Each mission in a rescue station is progressively harder, so you are given a promotion for further successes. Some rescue stations give you the chance to drive the rescue vehicles around an obstacle course.

This is not exactly an exciting program, but if your child is one of the many who love to pretend that they're a fireman, they're sure to have lots of fun with it. PCU

Tonka's rescue nerve centre.

Help airlift the stranded hikers over the river.

Bizzare online pastimes

Paul Zucker

looks at some of the stranger ways to use your favourite Web sites.

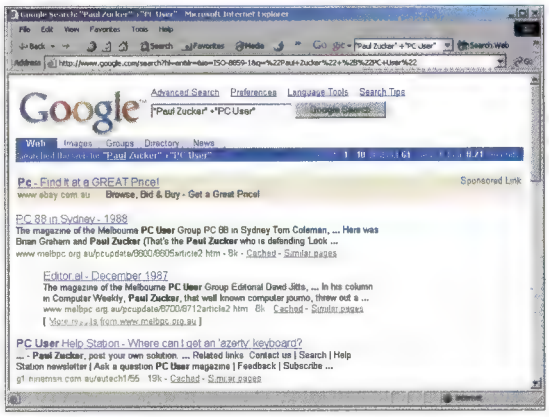
Egosurfing

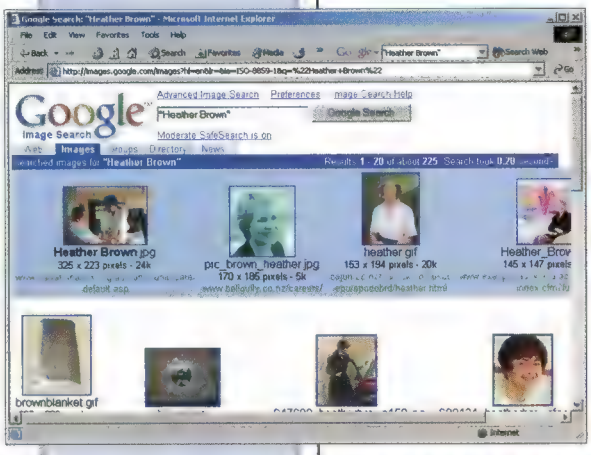
Egosurfing is the art of looking for yourself on the Internet. Depending on your fame, you may find references to yourself, but even if searches don't bring up references to you, you'll almost certainly find lots of people with the same name.

Make sure you put your name in quotes or you'll end up with mostly mis-hits. Let's take the famous Roy Slaven, for example. I just did a Google search (www.google.com) for "Roy Slaven" and got 757 hits (448 of them with a .au domain). For some reason, I also got a lot of hits for someone called John Doyle.

Googledating

Googledating is slightly less innocent than egosurfing. The basic concept is that you use your favourite search engine to find out all you can about a person. By adding search terms and researching on key information you find, it is possible to find out far more than the subject would want you to know. (But I guess many of you have already found that out while egosurfing.) For instance, it's not much use searching for "Jim Smith" when there are so many of them in the world, but by using some particular fact to narrow the search (suburb, employer, interests, and so on), you will find some other facts that help you. Other things worth trying in your search are details such as phone numbers and street name and number. However, you have to use some discretion with Googledating. After all, there's a fine line between curiosity and stalking. For instance, you'll find that a well-known weekly advertising paper is searchable on the Internet, but not for phone numbers. Otherwise, it would be just too easy for an estranged couple to keep an eye on each other in case they were selling the marital booty.





Photofitting

Photofitting uses another of Google's excellent search options. This time, you use the Images option button at the top of the Google search page. Let's say your mate's name is Heather Brown. Just use that expression (with quotes) in the search bar and you will find more pictures of Heather Browns than you can poke your mouse pointer at.

Lovesick?

Visit http://directory.google.com/Top/Society/Relationships/Dating/ where you will find an amazing collection of ways to contact the unrequited love of your life. Scary stuff!

Bibliogathering

This is all about you, too. Go to some of the big online bookshops and search for books whose author is 'you'. You've probably never written a book in your life, but there's no reason why you shouldn't gather a small collection of books that other 'you's' have written. Try it — go to Amazon (www.amazon.com) and use your name in the search bar. I have a nice little collection of books that I've written. PCU

Banking made easy

Never queue at the bank again. Paul Zucker runs through the features of Internet banking.

Quite frankly, I don't know how I did without Internet banking. Not only does it save me a lot of time and give me more control over things such as paying bills, but I'll be honest — it has saved my bacon on more than one occasion when I've almost forgotten a transaction that had to be made today!

Most banks offer an electronic banking service for account holders, and some of the building societies do, too. The banks would prefer that we do things this way, because it costs them a fraction of what it does to provide face-to-face service in a branch.

What you can do and how much it costs depends on the bank and the sorts of accounts that you have. Some people even change banks simply to get access to a better Internet banking service. Let's assume that you have three accounts: a current account (perhaps a cheque account), a special-purpose account (perhaps you're saving for a holiday or home deposit) and a credit or debit card. Here are some of the services and features you might use with Internet banking.

Balances and history

It's nice to know exactly what's in your account, and also to be able to see what transactions have occurred. You should be able to look back and see what's happened (including fees charged to your accounts) over the last few days, the last statement period, or even many months. Different banks have different ways of showing the current balance, so don't get confused if the totals don't seem to add up — the total may not show transactions made that day, for example.

Transferring money

You should be able to instantly transfer money between your own accounts. Most banks also allow you to transfer money to another Australian bank account, but this will probably take overnight to happen. This is still a lot faster and easier than paying by (or banking) a cheque. If you don't have a credit card, or if the person you're paying doesn't take credit card payments, this is an excellent way to pay for things, such as online auction items.

Paying bills

A common way to pay a bill online or by phone is via BPAY. This is an independent system that automates the process so that you only have to enter a couple of details and your bill is paid. The bill is marked as paid on that day, although the details aren't passed to the biller until the next working day. There are no fees for BPAY, but you may be charged a cash advance fee by your bank if you pay by credit card. (If the loyalty points are important to you, you may need to pay the bill by credit card direct with the biller.)

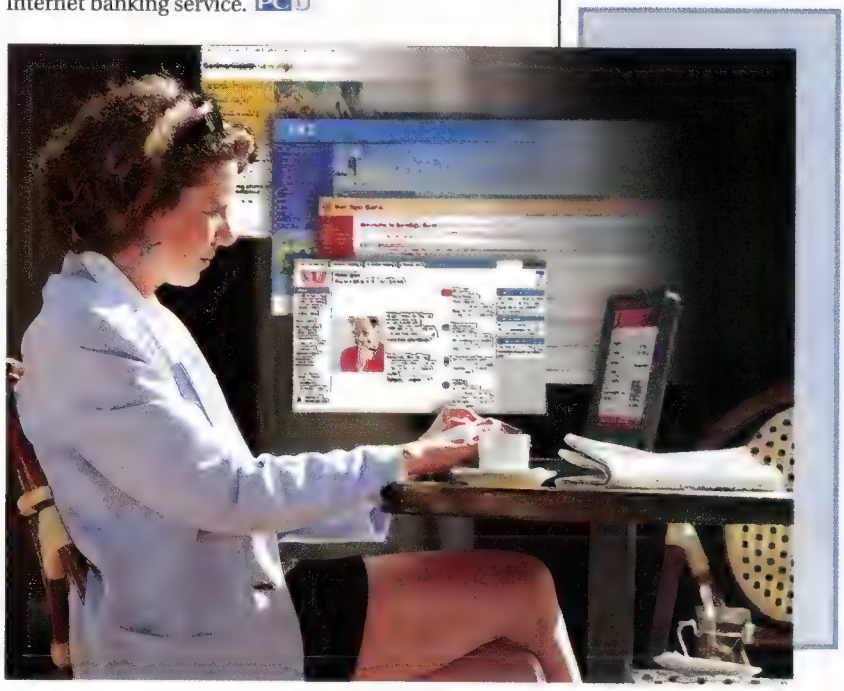
There's also a new service where you authorise the billers to send their bills directly to your Internet banking, so that they're there, ready for you to authorise them.

Another nice aspect of paying bills (or transferring money) online is that you can set it up for a future date. Say the electricity account comes in and you have three weeks to pay it. If you like, you can set up the payment and specify the day it will be made.

Automatic transfers

This feature will get better as the banks add more smarts to it, but even now you can do some nice things. For instance, you can set your main account to pay your credit card account in a specific way. This might be "Pay the total amount on the due date" or perhaps just the minimum amount. Eventually, you'll be able to put in extra conditions such as "Pay the total amount, but if that would leave less than $300 in the account, send me an email first".

The facilities and features (and the charges) of each bank will be different. It pays to hunt around and ask your friends what they use, and what they like and don't like about your bank's particular Internet banking service. PCU



Order Online: **CORPSOFT .COM.AU**

New Toll Free Order Line:

1300 SOFTWARE

1 3 0 0 7 6 3 8 9 2

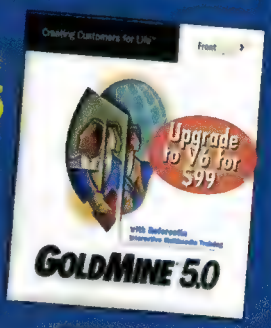
Super LOW Prices

- **MYOB Accounting** Version 13 **$269**
  Accounting Plus **$469**
  While stocks last

- **Microsoft Publisher 2000** **$99**
  While stocks last

- **MS Office 2000**
  New Install†
  Pro **$699**
  Std **$499**
  While stocks last
  † Upgrade bundled with competitive product

- **Goldmine Version 5** **$150**
  While stocks last



CorpSoft POPULAR BUYS

Windows XP Pro
N/Install **$445**
Upgrade **$405**

CorelDraw GraphicsSuite V11
N/Install **$925**
Upgrade **$425**

Easy CD & DVD Creator
Burn your entire world onto CD or DVD
$120

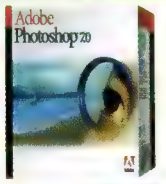
ABC-Igrafx Flowcharter 2003
N/Install **$495**
Upgrade **$185**

Small Business Win SPECIALS

MS Visual Basic Pro V6
N/Install **$899***
Bonus: inc. FREE MSDN Library
SPECIAL OFFER FOR MS OFFICE PRO USERS
Version 6 **$699** Version 5 **$399**

MS Intellimouse Explorer Optical
$55 ea
BUY 5 Get one FREE

Adobe Photoshop Version 7
N/Install **$1170**
Upgrade **$429**



Adobe Acrobat Version 5
N/Install **$390**
• HURRY !! — Limited stocks

CorpSoft SPECIALS LIST

Adobe Photoshop Album *NEW!* ...	$89	MS Project 2000 - New Install.....	$995
Adobe Photoshop Elements V2.....	$169	MS Publisher 2002 - Upgrade	$199
ACT! Version 6 – *NEW!*.....	$225	MS Visual Studio.NET Pro.Acad.....	$182
Corel WordPerfect Office II Upg	$285	MS Windows 98 2Ed - Upgrade.....	$230
Corel WordPerfect Office II Full.....	$399	MS Windows ME - Upg (from 98).....	$115
Crystal Reports Professional V9.....	$729	Norton Internet Security Std 2003.	$99
Dragon Nat. Speaking Pref V7.....	$349	OmniPage Pro V12 N/Install.....	$880
Intel EasyPC Camera.....	$50	OmniPage Pro V12 Upgrade.....	$320
Macromedia Dreamweaver 4.....	$575	Partition Magic Version 8.....	$119
MS Project 2000 - Upgrade.....	$525	WinZip V 8.1 - 1/10 users	$75/$520

- ***Call for our full Academic Price Range***
- ***We guarantee to beat any genuine competitor's price***

PLEASE NOTE: • Delivery: Post $11.50 or Courier $15.90 • We accept Bankcard Mastercard and VISA, but not AMEX or Diners. COD welcome • Phone, Fax and Mail Orders Welcomed • Goods ordered in error incur a 15% restocking fee • We Accept authorised returns for Credit within 10 days if goods are unopened and in saleable condition • Moneyback Offers (if any) are the responsibility of the manufacturer • E.& O.E • All Prices are Subject to Change Without Notice • Images shown are for illustration purposes only • Artwork prepared June 19th – prices advertised are GST inclusive. 8/03

CORPORATE SOFTWARE

AUSTRALIA PTY LIMITED

PHONE: (02) 9725 3700
FAX: (02) 9604 1983

Unit 1, 28 Victoria Street, Smithfield NSW 2164 • PO Box 6168, Wetherill Park NSW 2164

Order Online: CORPSOFT .COM.AU

New Toll Free Order Line:

1300 SOFTWARE

1 3 0 0 7 6 3 8 9 2

Microsoft WAREHOUSE CLEARANCE

Special Bonus

MS Office XP Pro
New Install
$799
Academic Ver. $299

• *HURRY !! – Offer ends July or while stocks last*

MS Office 2000
Std Upgrade or Crossgrade **$330**
Pro Upgrade or Crossgrade **$499**

ATTENTION OWNERS OF:
MS Works, Lotus 123, SmartSuite, WordPerfect, Word, Excel –
are eligible to purchase these at upgrade prices.

MS Office XP Std
Upgrade **$330**

MS Office XP Pro
Upgrade **$499**
(Upgrade from Office 97/2000 only)

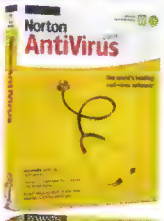
CorpSoft NEW FOR 2003

PaintShop Pro
Version 8
N/Install **$215**
Upgrade **$129**

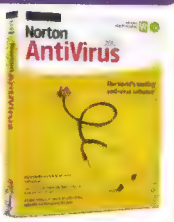
Adobe Acrobat V6
Std N/Inst **$529** Std Upg **$229**
Pro N/Inst **$829** Pro Upg **$329**

Nortons WAREHOUSE SALE

AntiVirus 2003
For Windows XP
1-User **$75**
5-User **$240**
• *Includes first 12 months virus updates*

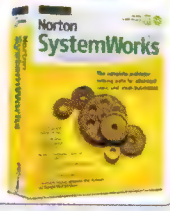


AntiVirus 2001
For Win95/98/NT/2000/ME
1-User **$55**
10-User **$440**
• *Includes first 15 months virus updates*



WinFax Pro
V10.02 for 98/XP
N/Install **$90***
**Latest version, Limited stocks, everybody qualifies*

SystemWorks Pro 2003
N/Install **$110**
SystemWorks Pro + Internet Security Bundle
N/Install **$199**



Found a Better Deal?

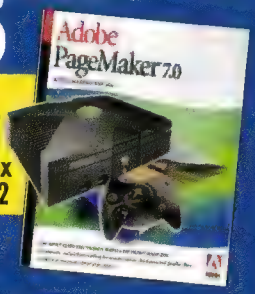
We guarantee to beat any genuine competitor's prices!

CorpSoft Bonus Deals

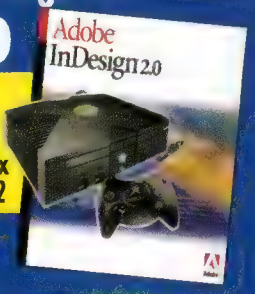
• **MS FrontPage 2002**
$310
BONUS: FREE Publisher 2002

• **Adobe Illustrator 10**
$949
BONUS: FREE Sony Home DVD Player
**Limit of one DVD player per customer - while stocks Last*

• **Adobe Pagemaker 7**
$1150
BONUS: FREE Microsoft X-Box or Playstation 2
**Limit of one console per customer - while stocks Last*



• **Adobe InDesign 2.0**
$1250
BONUS: FREE Microsoft X-Box or Playstation 2
**Limit of one console per customer - while stocks Last*



NEW TOLL FREE ORDER LINE: 1300 SOFTWARE

1 3 0 0 7 6 3 8 9 2

Phone (02) 9725 3700 • Fax (02) 9604 1983

100% AUSTRALIAN OWNED
Over 16 years in operation

www.newreality.com.au

SUPERIOR PERFORMANCE INKJET CARTRIDGES

CLICK IN & SAVE UP TO 60% OFF PRINTING COSTS

CANON COMPATIBLES FROM $6.00

Code	OEM Equivalent	Compatible With:	Price
CC-1BK	BJI-642	BJ-300/330 Black	$12.00
CC-2BK	BJI-201BK	BJC-600/610/620 Black	$6.00
CC-3BK	BJI-643BK	BJC-800/820 Black	$12.00
CC-4BK	BCI-21	BJC-2000/4000/5000 Series Black	$7.00
CC-5CL	BCI-21C	BJC-2000/4000/5000 Series 3-Colour	$12.00
CC-6BKHC	BJI-201BK HC	BJC-600/610/620 HI-Cap Black (14ML)	$9.00
CC-7BK	BCI-10	BJ-30 Black	$9.00
CC-8BK	BCI-11	BJC-70 Black	$9.00
CC-9CL	BCI-11C	BJC-70 3-Colour	$17.00
CC-11CL	BCI-61	BJC-7000 Series 3-Colour	$32.00
CC-12PCL	BCI-62 PHOTO	BJC-7000 Series Photo 6-Colour	$38.00
CC-13B	BCI-3	BJC-6000 Black	$25.00
CC-14C	BCI-3C	BJC-6000 Cyan	$16.00
CC-15M	BCI-3M	BJC-6000 Magenta	$16.00
CC-16Y	BCI-3Y	BJC-6000 Yellow	$16.00
CC-17PBK	BCI-3PBK	BJC-6000 Photo Black	$18.00
CC-18PC	BCI-3PC	BJC-6000 Photo Cyan	$18.00
CC-19PM	BCI-3PM	BJC-6000 Photo Magenta	$18.00

100% COMPATIBLE WITH YOUR CANON PRINTER

BUY 3 GET 1 FREE*

*Free item must be of equal or lesser value to your cheapest purchased image purchased

SATISFACTION 100% GUARANTEED

FREE DELIVERY AUSTRALIA WIDE

EPSON COMPATIBLES FROM $17.00

Code	OEM Equivalent	Compatible With:	Price
CE-51BK	SO20025	STYLUS 800/1000 Black	$16.00
CE-52BK	SO20034	STYLUS Colour/Colour Pro Black	$20.00
CE-53CL	SO20028	STYLUS Colour/Colour Pro 3-Colour	$30.00
CE-54BK	SO20047	STYLUS 200/820/Colour II /IIs Black	$13.00
CE-55CL	SO20049	STYLUS 200/820/Colour II /IIs 3-Colour	$21.00
CE-56PBK	SO20093	STYLUS Colour 400/500/600/Photo Black	$17.00
CE-57CL	SO20097	STYLUS Colour 200/500 3-Colour	$23.00
CE-58BK	SO20108	STYLUS Colour 800/850/1520 Black	$17.00
CE-59CL	SO20089	STYLUS Colour 400/600/800/1520 3-Colour	$23.00
CE-60PCL	SO20110	STYLUS Colour 700/Photo/Photo 700 5-Colour	$26.00
CE-61BKCL	SO20138	STYLUS Colour 300 4-Colour	$31.00
CE-65BK	SO20187	STYLUS Colour 440/640/660 Black	$16.00
CE-66BK	SO20189	STYLUS Colour 740/760 Black	$16.00
CE-67CL	SO20191	STYLUS Colour 440/640/660/740/760 3-Colour	$26.00
CE-68PCL	SO20193	STYLUS Photo 750 5-Colour	$33.00
CE-69CL	T003011	STYLUS Colour 900 Black	$19.00
CE-70CL	T005011	STYLUS Colour 900 Colour	$24.00
CE-71PCL	T001011	STYLUS Photo 1200 5-Colour	$29.00
CE-27BK	T007	STYLUS Colour 870/1270 Black	$24.00
CE-73CL	T008	STYLUS Colour 870 Colour	$29.00
CE-74CL	T009	STYLUS Colour 1270 Colour	$34.00

100% COMPATIBLE WITH YOUR EPSON PRINTER

BUY 3 GET 1 FREE*

*Free item must be of equal or lesser value to your cheapest purchased image purchased

New Reality's compatible inkjet cartridges will save you up to 60% when compared with the cost of original manufacturers cartridges.

Our cartridges are guaranteed to print as good if not better than the original.

And it's there in writing.

If you are not 100% satisfied with our cartridges return them and we will refund the full purchase price... guaranteed!

FREE CATALOGUE WITH EVERY PURCHASE

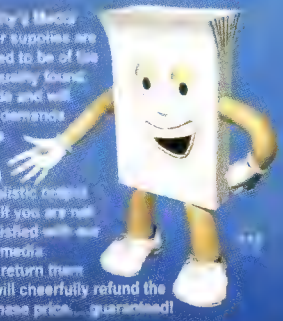
PAPER & MEDIA

SUPERIOR QUALITY AT AFFORDABLE PRICES

Product Code	Description	Sheets	Price	Price per Sheet
A4HRP	A4 90gsm Hi-Res Paper	100	$ 15.00	0.15
A3HRP	A3 90gsm Hi-Res Paper	100	$ 30.00	0.30
A4WF	A4 White Film 100mu	50	$ 47.00	0.94
A3WF	A3 White Film 100mu	50	$ 90.00	1.80
A4CF	A4 Clear Film 100mu	50	$ 39.00	0.78
A3CF	A3 Clear Film 100mu	50	$ 71.00	1.42
A4FGP	A4 Full Gloss Photo Paper	50	$ 44.00	0.88
A3FGP	A3 Full Gloss Photo Paper	50	$ 79.00	1.58
A4PH	A4 Economy Photo Paper	50	$ 23.00	0.46
AC2	Artists Canvas	25	$ 60.00	2.40
GC4F	Greeting Card (4 Fold)	100	$ 28.00	0.28
GCBF	Greeting Card (Bi-Fold)	100	$ 48.00	0.48
DCCS	Double Coated Card Stock	50	$ 24.00	0.48
GCS	Glossy Card Stock	50	$ 24.00	0.48
TTP	T-Shirt Transfer Paper	15	$ 15.00	1.00
MP	Magnetic Paper	25	$ 58.00	2.32
BC1	Business Cards (10 per A4)	20	$ 19.00	0.95

INCLUDES:
90gsm coated paper, 90gsm hi-res paper, white film, clear film, full gloss photo paper, economy photo paper, greeting card (4 fold), greeting card (bi-fold), glossy card stock, t-shirt transfer paper, business cards and magnetic paper!

New Reality's Media and Paper supplies are guaranteed to be of the highest quality found world-wide and will meet the demands of today's printers, including photo realistic output printers! If you are not 100% satisfied with our paper or media supplies return them and we will cheerfully refund the full purchase price... guaranteed!



AUSTRALIA WIDE FREECALL
1800 680 605

FREE AUSTRALIA WIDE DELIVERY! SAME DAY DISPATCH!!
COD * MONEY ORDER * CHEQUE * MASTERCARD * VISA * BANKCARD * AMEX

Copyright © 2000 New Reality Resources Pty Ltd. All rights reserved.

SUPERIOR PERFORMANCE INKJET REFILL KITS

REFILL & SAVE AT LEAST 80% OFF PRINTING COSTS

BLACK REFILL KITS FROM ONLY $24.90

Black kits include superior, dense & sharp black inks

DESCRIPTION (Kits Compatible with Printers listed below)	No. of Refills	Product Code
CANON BJ-30	60	20-BKL
CANON BJC-70/BJC 80	60	21-BKL
CANON BC-01/02 BJ-10E/20 BJ-200 Series & BJC-1000 Series	9	3-BKL
CANON BJ-300/ 330	7	4-BKL
CANON BJC-600/610/620	16	5-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	45	19-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BC-20	9	18-BKL
CANON BJC-3000/6000/8000 Series	12	46-BKL
HP Desk Jet 400/500 Series	6	8A-BKL
HP Desk Jet 600/660/690 Series	6	8B-BKL
HP Desk Jet 700/800/900/1000 Series	8	29-BKL
HP Desk Jet 300 Series & Olivetti JP's!	8	7-BKL
EPSON Stylus 400/800/800+/1000	8	1-BKL
EPSON Stylus Colour /PRO/XL	12	2-BKL
EPSON Stylus 820/colour II/IIs	12	23-BKL
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	12	33A-BKL
EPSON Stylus Colour 440/460/480/640/660/700/740/760/900	12	33B-BKL
IBM/LEXMARK 4076/1000/1020/2000/2030/2050 Series	12	35A-BKL
IBM/LEXMARK 5000/5700/7000 & Z Series	12	35B-BKL
CANON, EPSON, HP Fluorescent & Photo Realistic Kits!		Please Call!

COLOUR REFILL KITS FROM ONLY $34.90

Colour kits include cyan, magenta & yellow inks

DESCRIPTION (Kits Compatible with Printers listed below)	No. of Refills	Product Code
CANON BJC-70/80	3x30	22-CLR
CANON BJC-210/210SP/240/255/265/1000 Series	3x12	25-CLR
CANON BJC-600/610/620	3x8	10-CLR
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	3x30	17-CLR
CANON BJC-3000/6000/8000 Series	3x8	47-CLR
HP Colour Desk Jet 300/400/500 Series & Olivetti!	3x12	14A-CLR
HP Colour Desk Jet 600C/660C/690C Series	3x12	14B-CLR
HP Desk Jet 850C/855C/870C/1000C Series	3x3	30A-CLR
HP Desk Jet 710/720/890/900 Series	3x3	30B-CLR
EPSON Stylus Colour /PRO/XL	3x4	16-CLR
EPSON Stylus 820/colour II/IIs	3x12	24-CLR
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12	34A-CLR
EPSON Stylus Colour 440/460/480/640/660/700/740/760/900	3x12	34B-CLR
IBM/LEXMARK 4076/1000/1020/2000/2030/2050 Series	3x6	36A-CLR
IBM/LEXMARK 5000/5700/7000 & Z Series	3x6	36B-CLR
CANON, EPSON, HP Fluorescent & Photo Realistic Kits!		Please Call!

Your printer out Ditto? We stock Australia's largest range of printer consumables. Call now!

USING NEW REALITY'S INKJET REFILL KITS WILL NOT VOID YOUR PRINTER'S WARRANTY.

New Reality Resources has no affiliation with any printer manufacturers or OEM's and nor has any arrangement been made with them to form the basis of any statements we make.

FREE DELIVERY AUSTRALIA WIDE

New Reality COMPUTER SUPPLIES

New Ideas, New Products.... New Reality

New Reality Resources Pty. Ltd. ACN 073 906 617 Bayside Business Park
Australia Wide FREECALL - 1800 680 605 Shop 1 / 70 Redland Bay Rd
QLD Phone - (07) 3245 2411 Fax - (07) 3245 2755 Capalaba Q 4157
VIC Phone - (03) 9878 8288 Fax - (03) 9878 3933

Dealers wanted in all states and NZ!
For more information please call.

ALL PRICES INCLUDE GST

AUSTRALIA WIDE FREECALL 1800 680 605

All brand and product names are registered trademarks of their respective owners and used solely for identification purposes.

FREE AUSTRALIA WIDE DELIVERY! SAME DAY DISPATCH!!
COD * MONEY ORDER * CHEQUE * MASTERCARD * VISA * BANKCARD * AMEX

FREE DELIVERY AUSTRALIA WIDE!

www.arcco.com.au

ARC also holds a FULL range of parts for PC's

ARC COMPUTERS

Penrith	Parramatta	Liverpool	Silverwater	Chatswood
Ph: 02 47211046	Ph: 02 96335566	Ph: 02 98214690	Ph: 02 97488322	Ph: 02 98848655
Fax: 02 47222064	Fax: 02 96879165	Fax: 02 98214678	Fax: 02 97488155	Fax: 02 98848255
Cnr of High & Station St	85/87 Macquarie St	222 George St	3C 137-139 Silverwater Rd	Shop 1, 3-9 Spring St
penrith@arcco.com.au	parramatta@arcco.com.au	liverpool@arcco.com.au	silverwater@arcco.com.au	chatswood@arcco.com.au

Intel CPU (Skt 478)
P4 3.0 GHz 512K 533 $729
P4 2.8 GHz 512K 533 $477
P4 2.6 GHz 533 $358
P4 2.4 GHz 533 $298
CELERON 2.4 GHz $170
CELERON 2.3 GHz $160

AMD CPU
ATHLON 3000+ (Barton) $492
ATHLON 2800 Box (Fan) $326
ATHLON 2700 Box (Fan) $256
ATHLON 2600+ Box (Fan) $190
ATHLON 2400+ Box (Fan) $155
ATHLON 2000 Box (Fan) $145
DURON 1.3 GHz $78

Mother Boards
Gigabyte 8INXP(Skt 478) $417
Gigabyte 8SQ 800 Ultra(Skt 478) $255
ASUS P4PE(Skt 478) $175
ASUS A7V8X-X (Skt A) $132
Gigabyte 7N400PRO (Skt A) $210
Leadtek K7NCR18G-PRO(Skt A) $232
GA -8KNXP (Skt 478) $468
ECS P4VMM2 AIO(Skt 478) $100

Video Cards
GeForce 4
Leadtek FX 5800 TD 128MB $689
Leadtek FX5600 TD VIVO $361
Leadtek 128Mb Ti4200 DVI 8X $252
Leadtek MX440 64Mb DDR 8x $112
64MB DDR MX440SE W/TV $90

ATI
Radeon 9700 Ultimate 128Mb $730
Radeon 9600 Pro 128Mb 8x $374
Radeon 9000 Pro 64Mb TV $143

Sound Cards
Creative SB Audigy2 Platinum $436
Creative SB Extigy $307
Creative SB Audigy $158
SB LIVE PLAYER 5.1 $69
SB 128 PCI $28

MEMORY
PC133 128MB 4chip SDRAM $36
PC133 256MB SDRAM 63
PC2100 128MB DDR $46.20
PC2100 256MB DDR $47
PC2700 256MB DDR $63.40
PC2700 512MB DDR $116

Monitors
CRT
15" ACER $205
17" Viewsonic E70F $240
17" LG 700B Flatron $278
19" Mitsubishi 19" 1998 $373

LCD
15" OMNI $468
15" BENQ FP 567 $548
15" LG 1512S $531
15" SAMSUNG 151S (white) $739
17" Hitachi 174SXW (black) $856

Hard Disk Drives
20GB 7200 RPM $102
40GB 7200 RPM $108
60GB 7200 RPM $149
80GB 7200 RPM $156
120GB 7200RPM $201 (WD)

CASE'S/PSU
ANTEC LAN BOY $188
ANTEC SONATA $216
THERMALTAKE 5000 $212
ANTEC 380W TRUE POWER $139
ANTEC 480W TRUE POWER $186

ALL PRICES ARE SUBJECT TO CHANGE AT ANYTIME!

NOTEBOOKS

Highgrade: Ultinote 6600 (nVidia Geforce4 440) **$2874**
Mobile P4 1.8GHz, 15.1" LCD, 64MB Geforce4 AGP, 256MB DDR, 20GB HDD, 8X DVD, Modem, LAN, 4-in-2 Smartcard Reader, 4x USB 2.0, 12 Cell Li-ion Battery, Carry Bag, Win XP (Home)

Highlander: HL-86/P240DW-20 **$2874**
P4-2.4Ghz, 256M DDR, 20GB, Mod+Lan, Cdrw+Dvd, 15"XGA, Geforce-4 64M, 4x usb-2.0, TV-Out, IEEE-1394, Fir, 1x PCMCIA slot, LI-ION, Xp Home, 3.1Kgs, 1YR-ONSITE

Systems to suit you

HOME PREMIUM
AMD XP 2000 BOX
PC2700 512Mb DDR
Gigabyte 7VA
Antec Solution SLK1600
1.44 FDD
Samsung DVD R/RW BURNER
80Gb 7200
56K Internal Netcomm
Geforce4 MX440SE 64MbDDR w/TV
Benq 17" V774 Flat
Logitech Classic Desktop K/B&MS
Altec Lansing 221
Norton Anti Virus 2003 OEM
Microsoft Windows Xp Home
Microsoft Office Xp Small Buss

$2013

GAMER ENTRY
Intel P4 2.4G 512K
PC2700 512Mb DDR
Gigabyte 8PE800PRO
KW 8310SL-AL05 White
1.44 FDD
LG 16xDVD 48x24x48
80Gb 7200
Netcomm INT 56K
Radeon 9100 128Mb
Viewsonic 17" E70F FLAT
Microsoft Multimedia OEM
Microsoft wheel optical oem
Altec Lansing AVS500
Norton Anti Virus 2003 OEM
Microsoft Windows Xp Home
Microsoft Office Xp Small Buss

$2302

GAMER EXTREME
AMD XP 2400+ Box
PC 2700 512Mb KM
Gigabyte 7VAX1394
Radeon 9700 Pro 128Mb 8x
Western Digital 120Gb 8M JB
1.44 FDD & Netcomm INT 56K
LITEON 16XDVD
LITEON 52X24X52
Creative SB Audigy -2 PCI DE
Antec Plus660 AMG Case Silver
Mitsubishi 19" 1998FD FLAT
Microsoft Multimedia OEM
Microsoft Explorer optical oem
Altec Lansing 251
Microsoft Windows Xp Pro
Microsoft Office Xp Small Buss

$3250

the full experience on your new PC

Microsoft Windows XP Professional

Microsoft Office

- Designed for business networking.
- Premier mobile support for the ability to work offline or access your computer remotely.
- Greater security, including

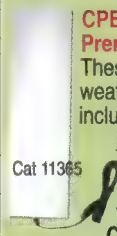
Microsoft® Office XP Professional includes:
- *Word 2002*
- *Excel 2002*
- *Outlook® 2002*
- *PowerPoint® 2002*

Think outside the Motherboard

2.4 GHz Wireless Equipment

Low-loss, Wireless LAN Surge Protector
Greatly reduces the risk of damage through lightning strikes, etc.
Cat 11389-9 $69

CPE (Customer Premises Equipment)
These all-in-one, high gain, weatherproof antennae include the RF module inside the flat panel housing, and connect through your USB port.
Cat 11365-9 12dBi **$519**
Cat 11386-9 18dBi **$589**

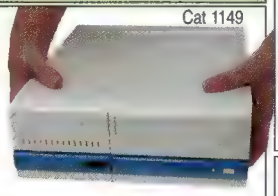


Wireless LAN Directional Antenna
If you need to communicate over longer distances one of these will provide your answer.

Cat 11350-9 15 dBi	**$199**
Cat 11351-9 19 dBi	**$219**
Cat 11364-9 25 dBi	**$299**
Cat 11367-9 10 dBi	**$99**
Cat 11378-9 95° 12dBi	**$729**

Wireless LAN Omni-Directional Antenna
A high gain resonant wave guide, slot antenna ideal for use in access points
Cat 11361-9 $999
Cat 11345-9 W/less LAN USB station adapter **$219**

Barebones Computers



Cat 1149-9 A very well designed, small footprint computer/ terminal, which uses the tiny VIA, ITX form-factor motherboard. It requires memory and a "standard" hard drive. **$559**

Cat 1150-9 This really tiny (49mm x 220mm x 165mm) Fanless Computer system utilizes the VIA ITX motherboard & operates from a 12-volt supply. **$749**

Low Noise Power Supply

Uses a thermatic fan which adjusts speed according to power supply temperature.
Cat 8957-9 $199

Casio CD Labeller

Don't scribble labels with a marker pen; turn out neat and clear legends with this low cost CD Printer.
Cat 5817-9 $259

Cables and Connectors

30 metre VGA Extension Cables? – No Problems – See our huge range of Audio and Visual cables and connectors.

POS Equipment

POS keyboards

Cat 8356-9 An xceptionally powerful, 55 key, re-programmable keyboard for Point-of-Sale **$289**

Cat 8922-9 Programmable POS keyboard with provision for the addition of a slot, card reader. **$259**

POS Pole Displays
Cat 8728-9 11.25mm **$359**
Cat 8907-9 9mm **$269**

POS Cash Register
Economical on both pocket and bench space, this unit has big display and automatic GST reporting and registration.
Cat 1008129-9 $289

Citizen POS Receipt Printers

These quality Citizen printers offer a reliable solution for the most demanding POS situations. Available in both Serial and Parallel.
Cat 5694-9/5695-9 IDP 3420 Bi-Directional with tear bar **$479**
Cat 5697-9/5696-9 IDP 3421 Bi-Directional with Auto Cutter **$549**
Cat 5698-9/5699-9 IDP 3423 Bi-Directional with Auto Cutter/paper rewind **$627**
Cat 5673-9/5674-9 IDP 3550 Bi-Directional friction feed **$519**

Macro Key Stick

NEW!
Fits above the function keys on your keyboard & will store macros strings up to about 1000 characters **Cat 15131-9 $299**

R.F. Link

Audio/video RF Link with repeater function. Send your DVD/Cable program to any TV in the house.
Cat 11808-9 $299 OR 2 for $500

Terminals

We have a range of Thin Client Terminals to suit most applications - Serial, Ethernet, Windows Based & Linux

Serial ATA

Plugs directly into a standard IDE hard drive to provide a serial ATA interface
Cat 2891-9 Horizontal **$79**
Cat 2892-9 Vertical **$79**

Cat 2893-9 This converter provides two serial ATA connectors from an IDE motherboard connector **$89**

Cat 1008113-9 Serial ATA cable 45cm **$24.90**

Cat 1008114-9 Serial ATA cable 60cm **$33**

RFID Proximity Readers

RFID readers can now connect to your PC via a standard serial port. Consider the applications for these versatile access tools.

Cat 1008079-9 RFID Controller **$269**
Cat 1008082-9 RFID Controller - Electric Door Lock **$189**
Cat 1008081-9 RFID Integrated Controller and Proximity Reader **$349**
Cat 1008083-9 RFID Proximity Card 0.8mm Thick **$4.50**
Cat 1008058-9 RFID Proximity Card 1.8mm Thick **$3.25**
Cat 1008059-9 RFID Proximity Key Tag **$6.50**

Cat 1008057-9 RFID Proximity Reader 200mm **$269**
Cat 1008080-9 RFID Proximity Reader 80mm **$209**
Cat 1008108-9 RFID Proximity Reader RS232 **Type 1 $199**
Cat 1008109-9 RFID Proximity Reader RS232 **Type 2 $219**

Parallel EPROM writer

Cat 3159-9 32 pin 8M **$479**
A large range of optional adapters are also available

Half-price Bits

Until end August 2003 or.....while stocks last!

Auto A/V switcher. 4 inputs 2 outputs
Cat 3438-9 Was $129 now $64 SAVE $65

Dual Exhaust Fan for Hard Drive
Cat 8564-9 Was $29 now $14 SAVE $15

Exhaust Fan – dual, adjustable, internal plenum
Cat 8420-9 Was $29 now $14 SAVE $15

USB 1.1, Internal Hub Front Access
Cat 2831-9 Was $59 now $29 SAVE $30

USB 1.1, Internal Hub Rear Access
Cat 2832-9 Was $49 now $25 SAVE $24

MicroGram Computers

Dealer inquiries welcome

Ph: (02) 4389 8444 FreeFax: 1800 625 777 **info@mgram.com.au**

Vamtest Pty Ltd trading as **MicroGram Computers** ABN 60 003 062 100, 1/14 Bon Mace Close, Berkeley Vale NSW 2261

All prices subject to change without notice. For current pricing visit our website. Pictures are indicative only.

See all these products & more on our website...www.mgram.com.au

SHOREAD/MGRM0803

AUSTRALIA COMPUTER ONLINE

tel: (02) 9747 0001; 9744 6667 fax: (02) 9747 8878 e-mail: pc@computeronline.com.au

Address www.computeronline.com.au Go! Links

Please check our Web Site for additional products, online ordering and updated prices. Prices include GST and are subject to change without prior notice

Computer Parts and Accessories

CPU's

intel

Celeron 2000	$129
Celeron 2200	$143
P4 - 2.4Ghz 533	$289
P4 - 2.66Ghz S478 533	$343
P4 - 2.8Ghz S478 533	$456
P4 - 3.0Ghz S478 533	$705

AMD

Athlon XP 2000	$132
Athlon XP 2200	$157
Athlon XP 2400	$165
Athlon XP 2500	$183
Athlon XP 2600	$204
Athlon XP 2800	$340
Duron 1300	$89

Hard disks

Notebook 20Gb	$150
Notebook 30Gb	$190
Notebook 40Gb	$230
Notebook 60Gb	$354
7200 RPM	
WD 400BB 40Gb	$110
WD 400JB 40Gb 8m	$123
WD 800BB 80Gb	$154
WD 800JB 80Gb 8m	$166
WD 1200BB 120Gb	$204
WD 1200JB 120Gb 8m	$226
Maxtor 30Gb	$109
Maxtor 40Gb	$120
Maxtor 80Gb	$165
Maxtor 120Gb	$207
Maxtor 120Gb 8m	$251

Seagate

Barracuda IV 40Gb	$124
Barracuda V 60Gb	$154
Barracuda V 80Gb	$164
Serial ATA 80Gb 8m	$240
Barracuda V 120Gb	$242
Barracuda 120Gb 8m	$252
Serial ATA 120Gb 8m	$302

Motherboards

Pentium III / Celeron

MSI-6368 with Lan	$132

Pentium 4

Gigabyte 8PE800	$143
Gigabyte8PE800 Ult	$242
Gigabyte8SQ800	$165
Gigabyte 8SG800	$130
Gigabyte 8SIMLH-P	$121
Gigabyte 8INXP	$330
Gigabyte 8KNXP	$412
Gigabyte SINXP1394	$297
Gigabyte 8IPE1000	$205
Gigabyte 8IPE1000P	$245
Gigabyte 8IK1100	$280
Gigabyte8IG1000pr	$231
ASUS P4PE Raid	$258
ASUS P4PE	$175
ASUS P4G8x Deluxe	$375
ASUS P4SGL-VM	$99
ASUS P4P800Deluxe	$308
ASUS P4C800Deluxe	$385
Elitegroup P4S5MG	$125
Elitegroup P4S5A	$125

AMD Athlon / Duron

Gigabyte 7VKML-P	$126
Gigabyte 7N400-L1	$155
Gigabyte 7VA-C	$125
Gigabyte 7N400pro	$209
Gigabyte7N400vpro	$275
Gigabyte 7NNXP	$305
ASUS A7V333 Raid	$200
ASUS A7V333	$140
ASUS A7V8X-X	$150
ASUS A7V8X Raid	$240
ASUS A7N8X Deluxe	$273
ASUS A7N266-VM	$129
MSI KT400 Ultra	$189
PCchips M810	$130
ECS K7S5A	$125
ECS L7VMM2	$125

Video cards

32Mb TNT2 AGP	$57
ATI Radeon VE 32Mb **PCI**	$117
64Mb GeForce 4 MX440 TV out **PCI**	$140
64Mb GeForce 2 MX400	$79
64Mb GeForce 4 MX440 TV out SDRAM	$89
64Mb GeForce 4 MX440 TV out DDR	$99
128Mb GeForce 4 MX440 TV out DDR	$119
Matrox G550 32Mb dual head AGP	$270

ASUS

GeForce 2 MX400 V7100 64M	$69
GeForce 4 V9180 8x 64Mb MX440	$136
GeForce 4 128Mb V9280 TV out 8X	$299
GeForce 4 128Mb V9280VS TV out 8X	$308
GeForce 4 128Mb V9900TD FX5800	$660
GeForce FX5200 9520 magic 128M	$167
GeForce FX5200 9520 video suit 128M	$267
GeForce FX5600 V9520 128Mb	$396
Leadtek Winfast MX440 A180 8x 64M	$105
Leadtek Winfast MX440 A180 VIVO 64M	$179
Leadtek Winfast Ti4200 A280 8x 128M	$289
Leadtek FX5200 A340 128M	$180
Leadtek FX5600 A310 128M VIVO	$363
Leadtek FX5800 A300TD 128M	$643
Leadtek FX5800 Ultra A300 128M	$826
ATI Radeon Gigabyte 9200 128Mb	$199
ATI Radeon Gigabyte 9200 64Mb	$155
ATI Radeon Gigabyte 9600 128Mb	$399

CD Rewriters / DVD writers

Sony CRX220E 52x24x52 IDE drive oem	$105
Liteon 52x24x52 IDE kit	$80
Liteon 40x12x40 USB external kit	$217
Liteon 48x24x48 16xDVD Combo	$139
Mitsubishi Diamond 52x24x52 oem	$99
Benq 5224P 52x24x52 IDE kit	$79
LG GCE 8520BB 52x24x52 IDE oem	$99
LG GCC - 4480B 48x24x48 16X DVD	$133
Pioneer A-05 DVD burner	$450
Sony DRU500A DVD burner	$549
Sony DRU510A DVD burner	$610
Sony DRX500ULX DVD burner External	$850

Memory

Call for the lastest prices

128M pc133	$55
256M pc133	$79
256M pc133 double	$110
512M pc133	$150
256M DDR 2700	$61
512M DDR 2700	$120

KINGMAX

256M DDR 2700	$75
256M DDR 3200	$90
512M DDR 2700	$130
512M DDR 3200	$160

Notebook memory

128M pc133	$85
256M pc133	$148
256M DDR 2100	$99

CompactFlash Memory

32M CompactFlash	$29
64M CompactFlash	$49
128M CompactFlash	$66
256M CompactFlash	$106
512M CompactFlash	$195

Smart Media Memory

64M Smart Media	$39
128M Smart Media	$75

Secure Digital Memory

64M Secure Digital	$66
128M Secure Digital	$81
256M Secure Digital	$179

Memory stick

32M Memory Stick	$59
64M Memory stick	$74
128M Memory stick	$125

USB Flash drive

USB drive 64M	$50
USB drive 128M	$75
USB drive 256M	$110
USB drive 512M	$187
USB card reader 5 in1	$40
USB reader MM,SD	$35

Sound cards

Sound BLASTER

PCI -128 oem	$35
Live DE 5.1	$75
Audigy DE	$146
Audigy platinum EX	$363
Audigy 2 6.1	$228
Audigy 2 platinum	$428
Audigy 2 platinumEX	$506

Add-on card

usb 1.1 2 port PCI	$30
usb 2.0 4 port PCI	$50
firewire card 3 port	$40
PCI serial ATA card	$60

Networking

NIC 10/100Mb	$16
SMC 10/100Mb	$20
5 port switch 10/100	$50
8 port switch 10/100	$60
USB hub 4 port 1.1	$40
USB hub 4 port 2.0	$50
USB to infrared	$60

CD & DVD Roms

52x CDROM	$45
DVD 16x **LG/Sams**	$75
DVD 16x **Pioneer**	$90
DVD 16x **Sony/liteon**	$75
DVD 16x **Diamond**	$90

Removable Storage

Floppy drive	$20
External box 2.5" USB	$85
External box 3.5" USB	$120
External 5" firewire	$135

Cases / Power supply

ATX midi case	$55
ATX **Aopen** KF45	$70
ATX **Aopen** H600	$155
ATX **Macase** KA380	$145
ATX Power 300w	$40
ATX Power 400w	$70

Computer Systems - 1 Year parts 2 Years labour return to base warranty

P4 Ultra Series

- **Gigabyte** motherboard
- 256m DDR PC2100
- 40Gb 7200rpm HDD
- Panasonic FDD
- 64mGeForce 4 MX
- S/B 128 sound card
- 16x DVD Rom
- 17" Benq monitor
- Subwoofer speakers
- Midi deluxe ATX case
- Microsoft Internet K/B
- Microsoft Intellimouse & pad

Celeron 2.0	$1040
P4 2.4G	$1200
P4 2.66G	$1260
P4 2.8G	$1400

AMD Gamer

- **Gigabyte** motherboard
- 256m DDR PC2100
- 40Gb 7200rpm HDD
- Panasonic FDD
- 64M GeForce 4 MX 440
- 3D sound card
- 52x CD Rom
- 17" Benq monitor
- Subwoofer speakers
- Midi deluxe ATX case
- Benq Win98 keyboard
- Microsoft Intellimouse & pad

Duron 1300	$900
Athlon XP2000	$950
Athlon XP2200	$980
Athlon XP2400	$990

Value P4

- **Pentium 4** motherboard
- 256m DDR PC2100
- 40Gb HDD UDMA 100
- Panasonic FDD
- 8M video card built-in
- 3D sound card built-in
- 56K modem V90
- 52x CD Rom
- 17" SVGA monitor
- 120 watt speakers
- Midi deluxe ATX case
- Win98 keyboard
- A4 mouse & pad

Celeron 2000	$799
Pentium 4 2.4G	$980
Pentium 4 2.66G	$1040
Pentium 4 2.8G	$1150

TV tuner cards

Leadtek TV 2000XP	$110
Excel USB TV Tuner	$160
Pinnacle PCTV	$125
Pinnacle PCTV Pro	$225

Cameras

Benq digital 2300	$231
Logitech QC 4000	$174
Logitech express	$70
Creative web cam	$75

MS Software

Windows ME / 98	$205
Windows XP Home	$181
Windows XP Professional	$286
Windows 2000 oem-full	$297
Office XP small business	$361
Office 2000 / XP Pro-full version oem	$466

Monitors

17" **Benq** 772	$196
17" **Benq** 774	$221
17" **Viewsonic** E70F	$220
17" **Mitsubishi** 1770	$213
17" **Mitsubishi** 1786FD	$276
17" **Samsung** 753DF	$251
17" **Philips** 107T	$259
17" **LG** 700S	$219
17" **LG** 700B	$267
19" **Benq** V991	$319
19" **Benq** V992	$394
19" Mitsubishi 1998E	$365
19" Mitsubishi 1998FD	$460
15" LCD **LG** LB1510S	$509
15" LCD **Benq** FP547	$498
15" LCD **Benq** FP567	$530
15" LCD **Mitsubishi** DV154	$520
15" LCD **Hercules** 720	$550
17" LCD **Benq** 767	$757
17" LCD **Benq** 791	$1065
17" LCD **Mitsubishi** 172	$795
17" LCD **Hitachi** CML175SXW	$848
17" LCD **Samsung** 172T	$1115
17" LCD **Samsung** 172W	$1220

Modems

56k internal	$35
Netcomm 56K internal	$40
56K external **Swann / Aopen**	$85
Netcomm Mega-i-Modem	$89

Speakers

240w SPKs	$15
400w SPKs with sub-woofer	$40
Creative inspire 2400 4 Spks	$80
Altec Lansing ACS22/300 $40/	$75

Mice

A4-Tech PS/2 or serial	$7
A4-Tech Optical mouse	$30
A4-Tech Optical wireless	$51

Logitech

Optical PS/2 or USB	$39
Optical cordless PS2/USB	$65
MX500 optical	$66
MX700 optical	$118

Microsoft

Intellimouse PS/2 oem	$20
Wheel optical oem	$39
Intellieye explorer oem	$60

Keyboards

Win98 AT or PS/2	$12
Benq PS/2	$16
Multimedia AT or PS/2	$20
Logitech access K/B	$41
Logitech cordless Elite Duo	$167
Microsoft internet	$36
Microsoft multimedia	$50
Microsoft wireless K/B,mouse	$99
Microsoft wireless optical	$159
A4 wireless k/b optical mouse	$90

We accept cash, cheque, Bpay or direct deposit. All orders are despatched after clearence.
Prices are exclusive of delivery and Insurance.

rectron
www.rectron.com.au

Melbourne : 795 Sprinvale Road Mulgrave VIC 3170
TEL : 03-9561 6166 FAX: 03-9561 8722
SYDNEY : 21 Vore Street Silverwater NSW 2128
TEL : 02-9748 7725 FAX: 02- 9748 7404

NVIDIA. G-FORCE FX5900
Leadtek Graphics

WinFast® A350 TDH

MyVIVO

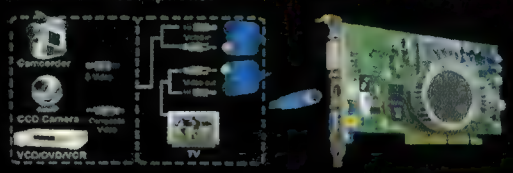
FX5900 / FX5900 Ultra

GUNMETAL
DirectX 9 Game
Cinematic Gaming Power with MyVIVO
Delivering the greatest realism through Cg language
DirectX 9 | 128 MB DDR | AGP8X

Special Features

- Video Capture
- Time-Shifting
- DirectBurn
- De-interlacing
- PIP-picture in picture

Connection Descriptions:



WinFast A300 Family

- WinFast A340 TD 128MB
- WinFast A340 TDH 128MB
- WinFast A310 TD MyVIVO 128MB
- WinFast A310 TD MyVIVO 256MB

* (support WinFast Cinema TV BOX)

Memory size: 128/256MB
T = TV-out
D = DVI
H = Hardware Monitor
MyVIVO = Video in Video out

- TV 2000XP EXPERT / A180(MX-440 . 8X) CINEMA AVAILABLE

Specifications

- NVIDIA GeForce™ FX 5900 GPU
- Supports VGA、TV-Out、DVI output
- Intellisample™ Technology
- nView Multi-display Technology
- Microsoft® DirectX® 9.0 and OpenGL® 1.4 support
- 256-bit Memory Interface with Advanced Memory Control
- MyVIVO video capture function support S-video and composite video
- 128MB high speed DDR memory
  Ball Bearing dust-free cooling fan system
- Architected for Cg

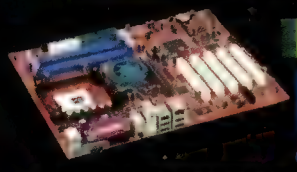
Valuable Bundle Software

Xbox game for PC platform with Cg language

- Freely transform between mesh and jet at the push of a button.
- Tool-up with an extensive armory of devastating weaponry. Customize your arsenal before each mission.

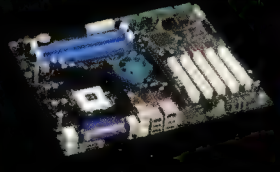
DirectX 9 Game

Leadtek®
We Make Dreams a Reality
www.leadtek.com.tw



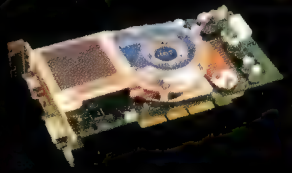
IS7

- Now up to 30% faster than other i865PE
- Supports 800/533/400MHz Intel P4 CPUs
- Supports Intel Hyper-Threading
- AGP 8x, 10/100 LAN, USB 2.0, IEEE 1394
- 4 x Serial ATA 150
- Onboard 6-Ch Audio and 24-bit S/PDIF In/Out



IC7-G

- Onboard 4 Phase Power
- The GigaSystem: Overclock FSB800 to 1000+ FSB
- Supports Intel Hyper-Threading Technology and PAT
- 4 X Serial ATA 150 RAID, AGP8X PRO
- 4 Dual DDR400, 8 X USB 2.0, 3 X IEEE 1394
- Intel CSA Gigabit LAN; ABIT's FanEQ
- Onboard 6-Ch Audio and 24-bit S/PDIF In/Out
- Supports ABIT MediaXP/Pro and Serillel 2



Siluro FX5800 DOTH

- nVidia GeForce FX5800 GPU
- 128MB DDRII Memory
- nView Multi-Display and Intellisample Tech
- Supports DirectX 9.0 and OpenGL 1.4
- Onboard TV-Out/DVI
- Onboard patented OTES III
- High Quality HDTV/DVD Playback

ALTECH Computers

Australian Distributor:
Altech Computers

Sydney:
9 Rachael Close,
Silverwater, NSW 2128
Tel: (02) 9735 5655
Fax (02) 9735 5656
sales@altech.com.au
www.altech.com.au

Brisbane:
64 Hope Street,
South Brisbane, QLD 4101
Tel: (07) 3017 2000
Fax (07) 3017 2020
info@altech.com.au
www.altech.com.au

Master Reseller:

NSW	Bokerp	1300 665 377	www.bokerp.com.au

Resellers:

NSW	Plus Corporation	1800 007 587	www.pluscorp.com.au
	A-Plus Solutions	(02) 9746 0288	www.aplus.net.au
	Friction Networks	(02) 9898 3055	www.friction.com.au
	SecretNet	(02) 9796 8233	www.secret.com.au
QLD	Dealer Dan P/L	1800 333 178	www.dealerdan.com.au
	GameDude	(07) 3387 1500	www.gamedude.com.au
	Ace Computer World	(07) 3812 3900	www.acecomputerworld.com.au
VIC	Scorpion Technology	(03) 9886 1615	www.scorptec.com.au
SA	Adrenalin Computers	(08) 8410 0777	www.adrenalin.net.au
TAS	Tasmanian Principal Comp.	(03) 6234 5677	www.tasmanianpc.com.au

Distributes hardware, software and peripherals

ABIT Antec ASUS X-MICRO SOLTEK SONY TYAN CORSAIR SAMSUNG AMD ZALMAN

Swann

easy communication

Swann Speed Demon
56K V.92 External Modem

- Voice/fax/data capabilities
- V.92 Upgradeable
- Operates vertically to save desktop space
- Comes with BONUS Swann NetTools CD and Telstra's "Free Hours" Internet CD

SwannSmart Turbo
56K V.92 External Modem

- Voice/fax/data capabilities
- Hi-speed, consistent Internet connection
- V.92 Flash upgradeable
- Comes with BONUS Swann NetTools CD and Telstra's "Free Hours" Internet CD

VersaCam Mini
USB Mini WebCam

- Quality colour CMOS sensor
- 360 degree tilt swivel clip
- Rubber-grip stand for stand-alone use, and cushioned clip for laptop use
- 640 x 480 pixel (VGA format), up to 15 frames per second

fast connectivity

USB 2.0 5-Port PCI Card

- Adds four external and one internal USB 2.0 Hi-Speed ports to your PC
- Back-compatible with both USB 2.0 and USB 1.1 devices
- Data transfer rates at speeds up to 480Mbps
- Connect high-speed and low-speed peripherals to your computer

SwannFire Cardbus
FireWire PCMCIA Card

- FireWire solution for laptop users
- Data transfer speeds of up to 400Mbps
- For laptop users and travellers
- Allows "hot swapping"
- 1 year warranty

precise navigation

Opti-Freestyle
Wireless Optical Scroll Mouse

- Wireless design allows freedom to move
- Optical sensor for precise and smooth navigation
- Light and compact - ideal for children and travellers
- Rubber grip finish provides comfortable palm placement

Opti-Glo Mini
USB Optical Mini Scroll Mouse

- Optical sensor for smooth gliding action and precise movement
- Base and scroll wheel illuminate when active
- Scroll and zoom functions for easy Internet and document navigation
- Perfect size for children and travellers

creative digital video editing

DV Starter

- Ideal for beginners
- Create quick & easy movies by applying filters, transitions, titles, and audio effects
- Learn the basics of getting started using bonus tutorial
- **Contents include:** 3-Port FireWire PCI Card, Ulead® VideoStudio® 5 DVD SE, Tutorial CD, FireWire Cable, and Instruction Guide.

DV HomePro

- Apply professional video filters, transitions, titles, and audio effects to family videos or childhood memories
- Create your own soundtracks with bonus sound creation software
- **Contents include:** 3-Port FireWire PCI Card, Ulead® VideoStudio® 6 DVD SE, Tutorial CD, SoundTrack Creation Software, FireWire Cable, and Instruction guide.

innovative security

SecureVision Alert 4
4 port PC/Video Surveillance System

- Ultimate, cost-effective security solution for the home or business environment
- Supports up to 4 local cameras (most USB or video input devices)
- Webcasting - view images on the Internet from anywhere in the world*
- Customisable motion detection and real-time viewing
- Be alerted of intrusions via email, mobile phone, or voice modem*
- Recording and playback capabilities
- Allows remote recording
- Comes with 4-port capture card
- Windows 98SE/ME/2000 & XP

*Terms and conditions apply

TV Camera Observation System

- Complete surveillance system
- High-quality CMOS black & white lens for crystal clear pictures
- Sensitive, built-in microphone

SpyCam

- Tiny size for undetected surveillance
- Easy installation
- Connects to a TV, VCR or security monitor

Telephone:
Fax:
Email:

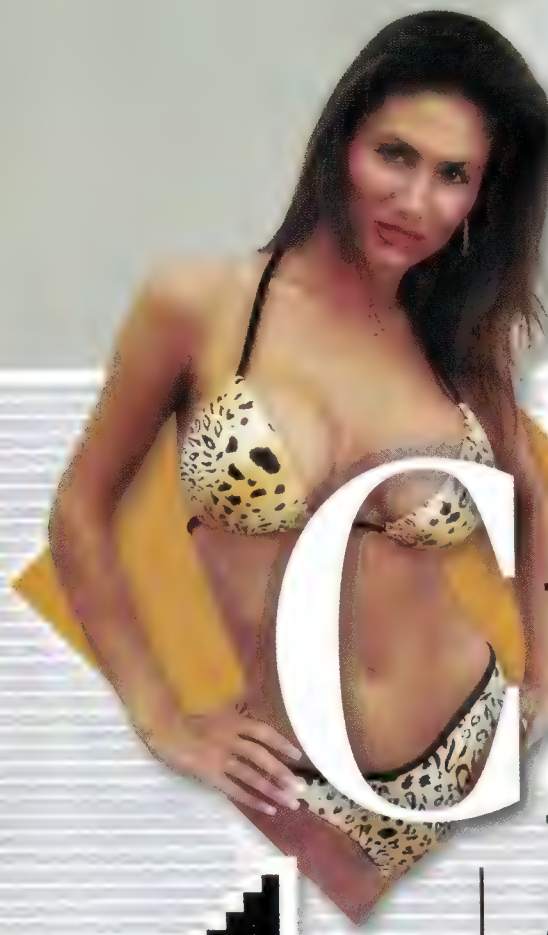
www.swann.com.au

Available at: DICK SMITH, POWER HOUSE, Tandy, Harvey Norman, MYER, MEGAMART, Officeworks Superstores

Selected products also available at: RETRAVISION, DAVID JONES, Betta ELECTRICAL, BIG W WE SELL FOR LESS

INGRAM MICRO

DISTRIBUTOR OF QUALITY PRODUCTS



UNLIMITED downloads
Broadband or Dial-up: Apply online

"C'mon... turn me on!"

Cheetah®

ADSL internet $79.95* p.m

hi-speed broadband, unlimited download!

*Additional activation or modem fees apply, extra in regional areas, all subject to terms and conditions

coolcats® 56k Dial-up $21.95* p.m

cool internet...

'All you can Use' with unlimited downloads

*Subject to terms and conditions and acceptable user policy. $27.95 in Regional/Country areas

Ozzieweb
do it smarter, do it faster...

ACN 075 090 943
Coolcats & Cheetah are registered trademarks of Ozzieweb Pty Ltd

Ph: 1300 72 73 74

VISA MasterCard Diners Club International AMERICAN EXPRESS bankcard

www.ozzieweb.net.au

ROCK A new generation of PC speakers

Sleek, sophisticated, and some models are 5.1 Capable.
Good quality at an affordable price.
Perfect to use with your DVD player, Perfect to suit your lifestyle!

MS-5126

MS-2126

MS-1168F

MS-802

MS-1168

Australian Master Distributor

www.anyware.com.au

Anyware™ COMPUTER ACCESSORIES

SYDNEY	MELBOURNE	PERTH	ADELAIDE	BRISBANE
TEL: 02-9879 5788 FAX: 02-9879 5388	TEL: 03-9763 8200 FAX: 03-9763 8400	TEL: 08-9242 8588 FAX: 08-9242 8688	TEL: 08-8347 0488 FAX: 08-8347 0466	TEL: 07-3856 3999 FAX: 07-3856 1777

Available through Anyware resellers across the country. Please ask your local computer shops for availability and prices.

www.websale.com.au

The Australia Number One Online-Shopping Site for

Ink & Toner Cartridges

Websale Pty Ltd
Phone: 02 9420 2178
Fax: 02 9418 8647
Email: info@websale.com.au
Address: 1/73 Longueville Rd
Lane Cove NSW 2066

* Websale Credit is the intellectual property owned by Websale Pty Ltd. Check www.websale.com.au for conditions of use.

shop wise CLASSIFIEDS

COMPANY LIST

• New Reality • Pelham • DiskMax • Upgrade Yourself Computers • Daitronics •
• Perfect Image Software • Matrix Micro Systems • Instinctive Software •

FOR ADVERTISING DETAILS, PLEASE CALL JULES FLAKELAR ON (02) 9288 9158.

www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au

SUPERIOR PERFORMANCE

INKJET REFILL KITS

REFILL & SAVE AT LEAST 80% OFF PRINTING COSTS

REUSE RECYCLE REFILL

We stock a large range specialty paper and media including High Resolution, Full Gloss, Clear Film and Magnetic Paper.

Why not try New Reality's 'Easy-to-Use' Inkjet Cartridges, available for all major brands of printers. Enquire today!

Your printer not listed? We stock Australia's largest range of printer consumables. Call Now!

BLACK REFILL KITS FROM ONLY $24.90

DESCRIPTION (Kits Compatible with Printers listed below)	No. of Refills	Product Code
CANON BJ-30	60	20-BKL
CANON BJC-50/55/70/80/85/85W	60	21-BKL
CANON BC-01/02/BJ-10E/20/200/BJC-210/240/255/265/1000	9	3-BKL
CANON BJC-600/610/620	16	5-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	45	19-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BC-20	9	18-BKL
CANON BJC-3000/6000/6200/6500/8000 & S400/S500 Ser es	12	46-BKL
CANON BJC-7000/7100 Series - Including Optimiser!	6	43-BKL
CANON BJC-8200 & S800 Series	6	52-BKL
HP Desk Jet 400/500 Series	8	8A-BKL
HP Desk Jet 600/660/690 Series	8	8B BKL
HP Desk Jet 700/800/900/1000/1100/1200 Series	8	29 BKL
HP Desk Jet 300 Series & Olivetti JP's!	12	7 BKL
EPSON Stylus 400/800/800+/1000	12	1 BKL
EPSON Stylus Colour /PRO/XL	12	2-BKL
EPSON Stylus 820/colour II/IIs	12	23-BKL
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	12	33A-BKL
EPSON Stylus Colour 440/460/480/640/660/670/700/720/740/760/900/1160	12	33B-BKL
EPSON Stylus Colour 680/777/780/785/870/880/875/890/1270/1280	12	Please Call!
LEXMARK 4076/1000/1020/2000/2030/2050 Series	6	35A-BKL
LEXMARK 3000/5000/5700/7000 Series	6	35B-BKL
LEXMARK Z11/Z12/Z22/Z31/Z32/Z42/Z51/Z52 & Other Z Series	6	35C-BKL

BUY 3 GET 1 FREE

Easy to use Refill Kits also available for Apple, Brother, Samsung, Sharp and Xerox Printers, Multifunction & Fax Machines...CALL NOW!

Black kits include superior, dense & sharp black inks!

COLOUR REFILL KITS FROM ONLY $34.90

DESCRIPTION (Kits Compatible with Printers listed below)	No. of Refills	Product Code
CANON BJC-50/55/70/80/85/85W	3x30	22-CLR
CANON BJC-210/210SP/240/255/265/1000	3x8	25-CLR
CANON BJC-600/610/620	3x8	10-CLR
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	3x30	17-CLR
CANON BJC-3000/6000/6200/6500/8000 & S400/S500 Series	3x8	47-CLR
CANON BJC-8200 & S800 Ser es	3x6	53-CLR
HP Desk Jet 300/400/500 Series & Olivetti!	3x12	14A-CLR
HP Desk Jet 600C/660C/690C Series	3x12	14B-CLR
HP Desk Jet 850C/855C/870C/1000C Series	3x3	30A-CLR
HP Desk Jet 710/720/890/900 Series	3x3	30B-CLR
EPSON Stylus Colour /PRO/XL	3x4	16-CLR
EPSON Stylus 820/co our II/IIs	3x12	24-CLR
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12	34A CLR
EPSON Stylus Colour 440/460/480/640/660/670/700/720/740/760/900/1160	3x12	34B CLR
EPSON Stylus Colour 680/777/780/785/870/880/875/890/1270/1280	3x12	Please Call!
LEXMARK 4076/1000/1020/2000/2030/2050 Series	3x6	36A-CLR
LEXMARK 5000/5700/7000 Series	3x8	36B-CLR
LEXMARK Z11/Z12/Z22/Z31/Z32/Z42/Z51/Z52 & Other Z Series	3x6	36C-CLR

BUY 3 GET 1 FREE

Easy to use Photo Realistic Refill Kits available for all Canon, Epson, HP & Lexmark Photo Quality Printers.....CALL NOW!

Colour kits include magenta, cyan & yellow inks!

All brand and product names are registered trademarks of their respective owners and used solely for descriptive purposes.

USING NEW REALITY'S INKJET REFILL KITS WILL NOT VOID YOUR PRINTER'S WARRANTY.
BEWARE OF INFERIOR COPIES, BUY THE "ORIGINAL" AUSTRALIAN REFILL KIT!
New Reality has no affiliation with any printer manufacturers or OEM's and nor has any arrangement been made with them to form the basis of any statements we make.

New Reality COMPUTER SUPPLIES

Dealers wanted in all states and NZ! For more information please call.

General Enquiries - (07) 3245 2411

FREE CATALOGUE WITH EVERY PURCHASE

100% SATISFACTION GUARANTEED

Freecall ORDER HOTLINE

1800 680 605

www.newreality.com.au

FREE AUSTRALIA WIDE DELIVERY! SAME DAY DISPATCH!!

COD * MONEY ORDER * CHEQUE * MASTER * VISA * BANKCARD * AMEX ACCEPTED

www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au

www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au

www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au www.newreality.com.au

Router Memory

Router memory available for all major brand switch / router manufacturers.

PELHAM PTY LTD
1/100 Yarrara Rd., Pennant Hills NSW 2100
(02) 9980 6988
ram@pelhampl.com.au
www.pelhampl.com.au

E&OE INCL GST 07/02

USB STORAGE KEYS

256Mb USB Key	$200
512Mb USB Key	$556

COMPACT FLASH

64Mb Compact Flash	$40
128Mb Compact Flash	$70

SECURE DIGITAL

64Mb Secure Digital	$74

MULTIMEDIA

64Mb Multimedia Cards	$87

CISCO

2600 8MB Flash Simm	$488

Camera & PDA Cards

6 in 1 USB Card Reader / Writer $63

Computer Ram

SDRAM

128Mb (16x64) PC100	$93
256Mb (32x64) PC133	$172
512Mb (64x64) PC133	$197

NOTEBOOK SDRAM

128Mb (16x64) PC100	$97
256Mb (32x64) PC100	$203

DDR

256Mb PC2100 DDR	$93
512Mb PC2100 DDR	$180

SIMMS 72 PIN

32Mb EDO 60ns	$67

Prices as at 14 May 2003
Memory available for all brands. Call for latest prices

Anypak drive™
www.anypakdrive.com.au
Call: (02) 9437 4114 | Fax: (02) 9437 1235

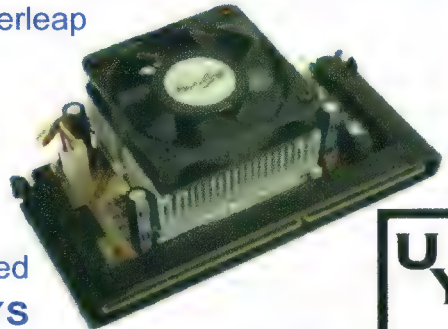
Back-up security has just been dramatically downsized. Anypak Drive is the world's smallest & lightest portable external disk drive, small enough to fit in your pocket, yet with complete 20GB, 30GB, 40GB, 60GB & 80GB back-up. Simply click, drag and drop your whole C Drive onto the Anypak!

Anypak is easy to install on either PC or MAC, interfaces with USB 1.1 / USB 2.0, and is perfect for safeguarding against disastrous data loss, providing additional drives for networks, protecting against hacking, and freeing up hard drive space for SOHO users.

Powerleap CPU Convertors www.powerleap.com

Upgrade Your Celeron or Pentium II to 1.4Ghz with Powerleap

PL-iP3/T Slot 1 Adaptor	$99
P370/T Skt 370 Adaptor	$99
With Celeron Tualatin 1.1Ghz CPU	$205
With Celeron Tualatin 1.3Ghz CPU	$225
With Celeron Tualatin 1.4Ghz CPU	**$260**



30 Day Money Back Guarantee if Not Completely Satisfied

Upgrade Yourself Computers OPEN 7 DAYS
1c South Creek Road, DEE WHY 2099 ph 02 9982 9939 **www.uyc.com.au**

UYC COMPUTERS

Mention this advertisement for bonus 100MB web space FREE with your new hosting account! Plans start at $12.50 a month.

instinctive. TECHNOLOGY

www.instinct.com.au

Web hosting. Website Design. Domain names.

- Value added hosting accounts
- User friendly feature packed Cpanel-X interface on all accounts
- Reliable Technical support
- Helpdesk interface / account login interface
- PHP / MySQL accounts
- Webmail on all accounts
- Flexible account upgrade / downgrade feature

Sign up for 12 months and get 1 month FREE!

sales@instinct.com.au HARRINGTON PARK, NSW AUSTRALIA | PO BOX 256 NARELLAN 2567 | ABN: 28 100 718 072

Two-grand tiger

apc EDITOR'S CHOICE JUL 2003

At last.. a PC that has the Power..

to do what you want without breaking the budget.

"Daitronics have squeezed just about everything you could want into this bundle, including a Canon i320 BubbleJet Printer and Canon LiDE20 scanner." - Editor July APC mag

Check out at **www.daitronics.com.au** and find out why we got the Editors choice in the July 2003 Sub Two-grand Lab Challenge. We are also offering other optimized bundles for gaming, office productivity and multimedia entertainment

Contact us for your nearest supplier

intel inside pentium 4

Dealer Inquiries welcome
Contact our Sales Staff for the full range of Daitronics products.

Daitronics Corporation
Ph: 1300 731733
Fax: 1800644321
sales@daitronics.com.au

DAITRONICS CORPORATION

"Intel, Intel Inside, Intel Inside Logo, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries."

matrix microsystems
www.matrixmicro.com.au

'Your Discount Online Computer Store'

Prices as at 14/06/03

CPU's

INTEL

Celeron 2.0GHz (socket 478)	$129.00
Celeron 2.2GHz (socket 478)	$149.00
P4 2.4GHz (533MHz FSB)	$289.00
P4 2.4GHz (800MHz FSB)	$319.00
P4 2.667GHz (533MHz FSB)	$334.00
P4 2.667GHz (800MHz FSB)	$399.00
P4 2.8GHz (533MHz FSB)	$459.00
P4 2.8GHz (800MHz FSB)	$480.00
P4 3.06GHz (533 MHz FSB)	$709.00
P4 3.06GHz (800 MHz FSB)	$739.00

AMD (incl. fan/heatsink & 3 Yr AMD warranty)

XP 2000+ (266MHz FSB)	$124.00
XP 2200+ (266MHz FSB)	$139.00
XP 2400+ (266MHz FSB)	$156.00
XP 2500+ (333MHz FSB)	$167.00
XP 2600+ (333MHz FSB)	$190.00
XP 2700+ (333MHz FSB)	$265.00
XP 2800+ (333MHz FSB)	$332.00
XP 3000+ (333MHz FSB)	$483.00
XP 3200+ (333MHz FSB)	$854.00

MOTHERBOARDS

ABIT - Socket 478

BE7	$239.00
BE7-RAID	$269.00
IT7-MAX2	$365.00

ABIT - Socket A

KD7	$199.00
KD7-RAID	$229.00
AT7-MAX	$249.00
AT7-MAX2	$269.00
NF7-S nForce2	$225.00
NF7-M nForce2 W. VGA	$275.00

ASUS - Socket 478

P4PE	$220.00
P4PE-SATA GB LAN	$279.00
P4G8X Gold	$339.00
P4G8X Gold Del.	$389.00
P4GE-V	$299.00
P4C800	$385.00

ASUS- Socket A

A7V333/A	$149.00
A7V8X	$165.00
A7V8X GB-LAN SATA	$245.00
A7N8X nForce2	$225.00
A7N8X Deluxe nForce2	$279.00

EPOX – Socket 478

4PDA!	$219.00
4PCA3+	$339.00
4PDA+	$299.00
4T4AU	$299.00

EPOX – Socket A

8K9A1	$159.00
8RDA+ nForce2	$179.00
8RGA+ nForce2 W.VGA	$269.00

VIDEOCARDS

Asus

V9180 GF4 MX 440 64MB 8X	$159.00
V9280 GF4 Ti4200 128MB	$319.00
V9280 S'Fast Ti4200 128MB	$399.00
V9520 GFFX Magic 128MB	$159.00
V9900 Ultra GFFX 128MB	$829.00

Gigabyte

ATI 9000 PRO 128MB	$199.00
ATI 9200 VIVO 64MB	$259.00
ATI 9600 PRO 128MB	$399.00
ATI 9800 PRO 128MB	$849.00

Leadtek

GF4 MX440 64MB 8X	$119.00
GF4 Ti4200 128MB VIVO 8x	$259.00
GF4 Ti4800SE VIVO 128MB 8X	$339.00
GFFX 5200 128MB 8X	$169.00
GFFX 5600 128MB 8X	$310.00
GFFX 5600 256MB 8X	$359.00
GFFX 5800 128MB 8X	$589.00

Sapphire

ATI 9200 128MB	$215.00
ATI 9500 128MB	$339.00
ATI 9600 PRO 128MB	$399.00
ATI 9700 PRO AIW 128MB	$789.00
ATI 9700 PRO Ultimate 128MB	$689.00
ATI 9800 PRO 128MB	$785.00

X-Micro

GF4 MX440 64MB 8X	$109.00
GF4 Ti4200 VIVO 128MB 8X	$259.00

HARD DRIVES

Seagate

40GB 7200rpm	$119.00
60GB 7200rpm	$154.00
80GB 7200rpm	$169.00
80GB SATA w/power conn.	$249.00
120GB SATA w/power conn.	$309.00
120GB 8MB cache 7200rpm	$285.00

Western Digital – 7200RPM

40GB 2MB cache	$109.00
40GB 8MB cache	$129.00
60GB 2MB cache	$149.00
60GB 8MB cache	$159.00
80GB 2MB cache	$155.00
80GB 8MB cache	$165.00
120GB 2MB cache	$199.00
120GB 8MB cache	$229.00
160GB 2MB cache	$339.00
200GB 8MB cache	$369.00
250GB 8MB cache	$549.00

MEMORY

DDR RAM

256MB Seitec PC2100	$65.00
256MB Seitec PC2700	$66.00
512MB Seitec PC2700	$135.00
256MB Corsair VS PC2100	$79.00
256MB Corsair VS PC2700	$89.00
512MB Corsair VS PC2100	$129.00
512MB Corsiar VS PC2700	$149.00
256MB Corsair XMS PC2700	$109.00
256MB Corsair XMS PC3200	$159.00
512MB Corsair XMS PC2700	$189.00
512MB Corsair XMS PC3200	$239.00
512MB Corsair TwinX PC2700	$300.00
512MB Corsair TwinX PC3200	$349.00

And So Much More...

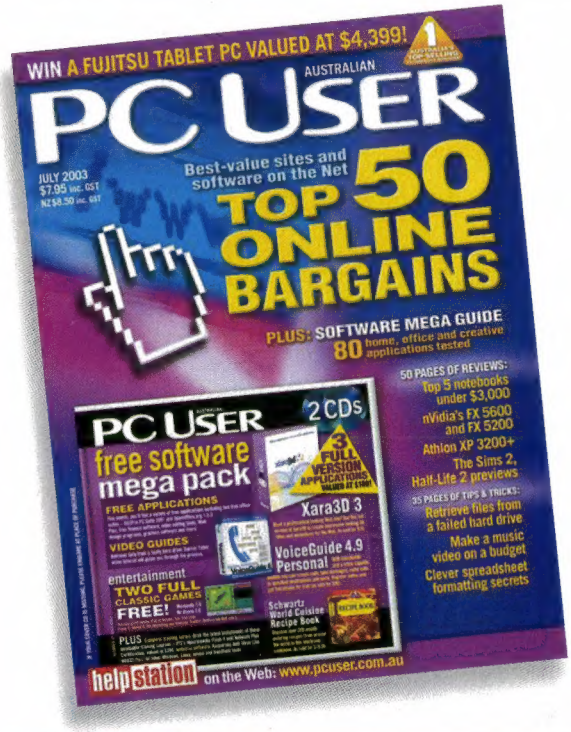
AUSTRALIA WIDE DELIVERY
Proudly Australian Owned and Operated

Visit www.matrixmicro.com.au to view our extensive product range and purchase direct.

Phone (02) 4295 3998 Fax (02) 4297 8744 PO Box 158, Shellharbour Square, NSW 2529 email: sales@matrixmicro.com.au

Secure online purchasing provided through ANZ e-Gate® All prices include GST, Payment by Credit Card (Bankcard/Mastercard/VISA), Direct Deposit, Bank Cheque or COD. Prices subject to change without notice.

- An audience of active technology buyers
- Authoritative editorial environment for your advertising
- High rates of response for excellent return on your investment



To book your advertisement or
for more information,
contact Jules Flakelar
on 02 9288 9158
Email: jflakelar@acp.com.au

AUSTRALIAN PC USER

Sound BLASTER

AUDIGY 2™ PLATINUM

the ONLY sound card that PLAYS BACK DVD-AUDIO & MORE

Sound Blaster 24-bit ADVANCED HD™ represents the finest 24-bit audio entertainment you can get on the PC. Through the use of ingenious, state-of-the-art analog audio design/circuitry, premium audio component and high-resolution audio processors, you can experience an improvement audio quality up to 8x over 16-bit audio.

for more details check out www.australia.creative.com

Sound BLASTER 24-bit ADVANCED HD 192kHz/106dB SNR

FULLY LOADED WITH UNBEATABLE FEATURES!

106dB SNR

8 TIMES BETTER SOUND QUALITY
Astounding 106db SNR audio quality compared to regular 16-bit audio card at 90db SNR.

LUCASFILM THX

THE ONLY THX® CERTIFIED SOUND CARD
Endorsed by the audio experts in the movie industry for the most awesome cinematic experience.

DOLBY DIGITAL EX

THE ONLY DOLBY® CERTIFIED SOUND CARD FOR DOLBY DIGITAL EX
Get True Dolby Digital EX support for rear movie centre channel for intensified 6.1 movie realism.

24-bit/96kHz RECORDING

RECORD AT THE HIGHEST POSSIBLE AUDIO FORMAT OF 24-BIT/ 96KHZ
Capture all the subtle details of the original recording with pure audio recording path.

CREATIVE MEDIASOURCE

THE 1ST MEDIA PLAYER WITH DVD-AUDIO PLAYBACK
Playback DVD-Audio discs at 24-bit/ 192 kHz in stereo or 24-bit/96kHz in 5.1 mode.

6.1

ULTRA IMMERSIVE 6.1 SURROUND SOUND EXPERIENCE
Enjoy automatic 6.1 positional audio on any games which support 3D audio.

EAX ADVANCED HD

POWER UP WITH CREATIVE'S EAX ADVANCE HD™
Gives you the most realistic music playback and immersive gameplay.

SB1394

SUPER-FAST SB1394 PORT
Transfer audio/ video content at blazing speed of up to 400Mbps.

Sound Blaster Audigy 2 Platinum

Superior 24-bit ADVANCED HD audio technology for your music, games and movies.
Also comes with convenient front panel connectivity for expanded options.

Sound Blaster Audigy 2

Get the best of digital music, gaming and movie experiences with the superior 24-bit ADVANCED HD audio technology!

Recommended Companion
Creative Inspire 6.1 6600

CREATIVE INSPIRE

Hook up Creative Inspire 6.1 6600 to Sound Blaster Audigy 2 and experience spetacular 6.1 desktop entertainment with Dolby® Digital EX encoded movies, and incredible EAX® and Microsoft® DirectSound® 3D effects in games.

WARNER VISION

DVD AUDIO

For a list of all DVD Audio titles available visit www.warnervision.com.au

CREATIVE
CREATIVE LABS PTY LTD

©2002 Creative Technology Ltd. All rights reserved. All other Logos, Brands or Product are trademarks or registered trademarks of their respective holders and hereby reconized as such

Creative Labs Pty Ltd: Locked Bag 5000 Banksmeadow NSW 20
Tel (02) 9666 6100 Fax (02) 9666 6900 www.australia.creative.c

en up a photo lab for $199.RRP

Canon i450 bubble jet printer. Borderless photos up to A4 size – at home. Prints directly from Canon al cameras – no computer required.* 4800dpi printing and MicroFine Droplet Technology™ eliminate iness. Includes easy-to-use software for professional looking results. **www.canon.com.au 1800 021 167**

Canon

advanced simplicity™

k canon.com.au or camera user's guide for compatibility details. Advanced Simplicity is a trademark of Canon Australia Pty Ltd. Fine Droplet Technology is a trademark of Canon Inc. CIP3186/PCU